

<p>Funded by: Ministry of Environment and Forest (MOEF), Govt of India</p>	<p>Salient Features The achievements were summarized as the extraction dyes from various parts of natural dye bearing plants of N E Region. 1. <i>Rubia cordifolia</i> 2. <i>Beta vulgaris</i> 3. <i>Garcinia xanthocymus</i> 4. <i>Semecarpus anacardium</i> 5. <i>Tectona grandis</i> 6. <i>Mallotus philipensis</i> 7. <i>Bixa orellana</i> 8. <i>Hibiscus subdariffa</i> 9. <i>Malastoma malabathricum</i> 10. <i>Cestrum nocturnum</i> 11. Naginishura (Local name) 12. Saraswati (Local name) 13. Laat kochu (Local name) 14. Bishohora (local name) 15. Puroi (Local name). The extracted dyes are purified and concentrated by using membrane and adsorption technique (different bio-mass samples are used as adsorbent). The dyes are collected in different forms, some are in the powdered form and some are in the paste and liquid form. The dyes are being used for dyeing food, papers and cloth</p>
<p>GAP</p>	<p>Council of Science and Technology for Rural India Center at NEIST (CSTRI Center - NEIST)</p>
<p>Chief Advisor- Dr PG Rao</p> <p>Advisor- P Barkakoti S C Kalita</p> <p>PI- Mr Dipankar Neog</p> <p>CoPI- Ms I Ilika Zhimo</p> <p>Members- Mr JJ Bora Mr D Basumatari Mr Ajoy Borkatoki</p> <p>Funded by: DST, New Delhi</p>	<p>Objective</p> <ul style="list-style-type: none"> • To set up a Center for Council of Science and Technology for Rural India (CSTRI) which will act as an intermediate to solve the identified scientifically solvable problems of rural areas of North East Region (NER) of India through the inputs of funding, expertise domain experts, proved technologies, business scale up and overall monitoring of implementations of the projects. • To develop the action plan of the center and form a core team to realize and implement the plan. • To develop a format to evaluate the “Rural Resources and Need Appraisal” in the context of rural areas of the North East India. • The center will identify the thrust areas in the rural NER such as- rural decentralized energy generation and distribution (e.g. bio-energy, solar energy, micro-hydral etc.); rural health including water, sanitation etc.; technology for bamboo based products & their value addition; appropriate technology for small tea growers; technology bases services during natural calamities like flood, earthquake etc.; technologies for food processing & preserving; technologies for mechanized cultivation; specific technologies for rural group having traditional expertise etc. • Center would carefully assess the need and nature of the intervention required in the area at the specific location. Working along with the local groups in the rural areas, a proposal for interventions would be prepared and submitted to the council. • The center will organize work-shop, training programme and technology demonstration in the identified areas. • The center will provide secretarial assistance to the council for its activities. <p>Salient Features</p> <ul style="list-style-type: none"> • Planning technology-based interventions for the improvement of livelihood of rural sections. • Identification of proper problem, S&T needs and possibilities for projects which have high impact potential. • Harnessing domain experts from R&D needs and possibilities for projects which have high impact potential. • Creation of appropriate technological solutions & viable business models for large scale expansion/extension.

	<ul style="list-style-type: none"> • Arranging funding for potential project proposals and overall monitoring on the same. • Organize workshops, training programmes, discussions etc. & generate/commission studies.
GAP	Development of low cost process for fluoride removal from contaminated water specific to NE Region for public use
<p>PI- Dr (Mrs) Aradhana Goswami</p> <p>CoPI- Dr RLGoswami, Mr PK.Goswami</p> <p>Member- Mr Tobiul Hussain Ahmed</p> <p>Funded by: Ministry of Environment and Forest (MoEF), Govt of India</p>	<p>Objective To develop an economically feasible and environmentally sound simple process for defluoridation of water to provide potable water to the rural house. Gainful utilization of waste material like paddy husk ash and environmentally harmful weed <i>Ipomea Cornea</i>.</p> <p>Salient Features</p> <ul style="list-style-type: none"> • Collection of raw material and characterization. • Fabrication a of <i>Ipomea Cornea</i> carbonization unit. • Preparation of adsorbent by burning of paddy husk ash and carbonization of <i>Ipomea Cornea</i> and Characterization of prepared adsorbents. • Defluoridation study: This includes by changing the adsorbent doses, by changing the stirring time, by changing the pH(both acidic and alkaline), by using chemical activator like Alum and PHAC.
GAP	Economic process for the drying of UMOROK chili and turmeric and their quality evaluation with stability study
<p>PI- Mr PK Goswami</p> <p>Co-PI- Dr (Mrs) Aradhana Goswami</p> <p>Member- Mr Tobiul Hussain Ahmed</p> <p>Funded by: Ministry of Food Processing Industries, Govt. of India</p>	<p>Objective To develop an economic and suitable method for drying of Umorok chilli of Manipur and turmeric so that it can be well preserved for a long period of time without compromising with it hotness(for chilli), colour (for both chilli and turmeric) and flavor. It must also be well transported so that it meets the demand of both national and international market.</p> <p>Salient Features Drying characteristics of Umorok Chilli and Turmeric at different temperature and different power with different drying techniques like microwave drying, hot air drying and drying in a atmosphere of constant relative humidity were done. Work was in progress to develop a suitable drying model in microwave drier for both the materials. Extraction and characterization of bio molecules from both Turmeric and Chilli by solvent extraction method were in progress.</p>
Inhouse	Molecular recognition stimuli responsive smart polymeric gel microcapsule membrane for control release application: probing role of diffusion limitation in gel microstructure
<p>PI- Dr Swapnali Hazarika</p> <p>Funded by: CSIR, New Delhi</p>	<p>Objective To formulate a microcapsule membrane system comprising a “Core-Shell” configuration with polymeric gel prepared by insitu polymerization of poly(N-isopropylacrylamide-co-benzo-18-crown-acrylamide) through a suitable approach and environment and characterize the membrane system (by instrumental techniques) in terms of microcapsule size, “core-shell” pattern, gel microstructure (with emphasis on porous network) and deduce the role of critical parameters of polymerization. To perform experimental study on substrate release into confined media simulating a real system</p>

	<p>environment, generate transient concentration profile under various plausible conditions with a formal mathematical model representing the physico (chemical) phenomena, validate with experimental results and simulate to extract the diffusion parameters.</p> <p>Salient Features</p> <p>Specific smart polymeric gel microcapsule membrane was been prepared and characterized using a polymeric system comprising Benzo-18-crown[6]acrylamide and poly(N-isopropylacrylamide), with the aim of elucidating the role of diffusion in the control release process. Experimental protocol and prototype were developed for the control release of Vitamin – A and Vitamin H in a simulated media. Modelling and simulation work for development of Diffusivity model of control release system.</p>
<p>In-house</p>	<p>Process development and design of prototypes for commercial and domestic utilization of biomass waste as a non-conventional source of energy</p>
<p>PI- Mr SC Kalita</p> <p>Members- Mr JJ Bora Mr D Neog Mr BK Sarma Mr A Borkotoky Mr A Kalita Mr Dipul Kalita</p> <p>Funded by: CSIR, New Delhi</p>	<p>Objective</p> <p>(a) Generation of database for all prospective sources of biomass waste available in the North Eastern Region of India.</p> <p>(b) Process development and implementation for using this biomass as a fuel and to extract energy directly from biomass in the readily usable form as heat.</p> <p>(c) To develop suitable units to recover energy efficiently from such waste for use in mini and micro scale industries and also for domestic purposes, particularly in the rural sector.</p> <p>Salient Features</p> <ul style="list-style-type: none"> Field visits to different “Agar Oil” distillation plants are made and discussed with the proprietors of the plant to adapt our technology after necessary dimensional modifications of the already developed unit to make it suitable for the distillation of high value, export quality “Agar Oil”.

Geo Sciences

<p>GAP</p>	<p>Modeling of earthquake source and ground motion in Chedrang fault and its vicinity through broadband instrumentation: an approach towards the estimation of earthquake hazard in NER, India</p>
<p>PI- Dr S Barua</p> <p>Members- Dr R Duarah Dr PK Bora</p> <p>Funded by: Ministry of Earth Sciences, New Delhi</p>	<p>Objective</p> <p>Characterization of source of the earthquake in Chedrang valley</p> <p>Salient Features</p> <p>Source characterization of the events from Chedrang Valley:</p> <p>Source characterization of the events was carried out through waveform inversion. These events were recorded by the three station network under operation in Chedrang valley – the rupture area of Great Assam Earthquake of 1897.</p> <p>The true characterization of the events could be explained in details indicating the seismic moment, faulting pattern and the source parameters of the associated fault. Although few events associated to Chedrang fault,</p>

were characterized, true characterization of Chedrang fault could be achieved after estimation of several more events (preferably higher magnitude events) originated from Chedrang fault.

Estimation of Conrad depth by inversion of Travel times of reflected and converted phases:

In this study, an attempt was made to determine seismic velocity structure of the crust and upper mantle beneath the Shillong - Mikir Hills plateau in northeast India region. The principle of the technique is to relate seismic travel times with crustal thickness above the Conrad and Moho discontinuities. Broadband digital waveforms of the local earthquakes make it possible precise detection of the seismic phases that are reflected at these discontinuities. The results showed that the Conrad discontinuity is at 18 ± 0.5 - 20 ± 0.5 km beneath the Shillong - Mikir Hills plateau, and the Moho discontinuity is at 30 ± 1 km beneath the Shillong plateau and at 35 ± 1 km beneath the Mikir Hills.

Intrinsic and Scattering Attenuation in Chedrang fault and its vicinity – the rupture area of Great Assam earthquake of June 12, 1897 (M=8.7):

The attenuation of seismic wave is one of the basic physical parameter used in seismological studies which is closely related to the seismicity and tectonic activity of a particular area. In the present study attenuation properties of the crust beneath Chedrang Fault and its vicinity, the rupture area of great Assam Earthquake of June 12, 1897 (M 8.7) was studied using waveforms recorded by a local seismic network composed of five stations. Total 20 local earthquakes were analyzed to estimate (i) coda wave attenuation quality factor (Q_c) applying single scattering model, (ii) Total attenuation quality factor (Q_t) from direct S wave applying spectral ratio method and (iii) intrinsic and scattering attenuation quality factor (Q_i and Q_s) following the approach of Wennerberg (1993). Coda Q (Q_c) values were obtained using different coda window lengths (20, 30 and 40 sec) for frequency bands centered at 1, 1.5, 2, 3, 4, 6, 8, 12, 16 and 18 Hz. This study indicated that Q_c increases with increasing lapse time and that Q_c is frequency dependent following the attenuation-frequency relation $Q_{c(20)} = 36.29 \pm 1.18f^{1.45 \pm 0.09}$, $Q_{c(30)} = 69.92 \pm 1.11f^{1.23 \pm 0.06}$ and $Q_{c(40)} = 117.08 \pm 1.08f^{1.07 \pm 0.05}$ for 20, 30 and 40 sec respectively. This behavior is usually correlated to the presence of heterogeneity in the crust and to the degree of tectonic complexity underneath the study area. The Q_c^{-1} values for this area follow a substantially similar trend of Q_c^{-1} decay with frequency as the other tectonically active regions of the world.

Finally from the separation of Q_s and Q_i values it was observed that the study area could be characterized by a low scattering attenuation (small scattering Q inverse, Q_s^{-1}) and by a relatively high intrinsic attenuation (high

<p>GAP</p>	<p>On-line/ real-time seismic network for disaster mitigation in NE India</p>
<p>PI- Dr R Duarah</p> <p>Funded by: North Eastern Council, Shillong</p>	<p>Objective</p> <ol style="list-style-type: none"> a. Real-time Seismic data acquisition and Event location b. Publication of Seismic bulletin through web page, mail notification and database update c. Delineation of active tectonic lineaments d. Site specific Seismic Early warning, e. Hazard communication, public education and awareness

Salient Features

- a. Network of 24 High resolution observatories to monitor the seismicity of NE India.
- b. Ext C Wide Area VSAT Network for 2 way communication, and unmanned operation
- c. Central Recording Station for Network command control, operation & maintenance
- d. Real-time Data archival, event location and dissemination of results
- e. Delineation of seismicity rate & trend, swarm and quiescence of a near real-time
- f. Mirror sites for real-time data storage, dissemination and security
- g. Updated Digital database since 2005, and Annual Seismological Bulletin
- h. Seismic Subnet to monitor the activities for individual tectonic blocks, processing of local raw data for site specific Early warning.

The North East Wide Area Seismic Network (NEWSN) operative since 2005 was installed in a phased manner. The main objective of the network is to provide on-line data and real-time event location for web publication, and to issue site specific early warning. Presently, 24 remote seismic observatories installed within NE India are connected with the Central Recording Station (CRS) using Ext C VSAT link, and the network is capable of monitoring the seismicity of the major tectonic lineaments and source zones on a real-time basis. Recently, a subnet of 9 broadband stations has been installed to intensify the seismic monitoring in the Naga Hills segment. It is proposed to install 2 other subnets covering Shillong-Mikir Plateau and the Arunachal Himalaya to give better coverage of the region. The subnets will have provisions for processing localized data, and help identify the crustal velocity structure for different source zones/tectonic regime as required for site specific early warning.

Materials Sciences

<p>GAP</p>	<p>Characterization, beneficiation and utility study of some graphite deposits from Arunachal Pradesh</p>
<p>PI- Dr Pinaki Sengupta</p> <p>Funded by: Min of Mines, Govt. of India</p>	<p>Objective Chemical and mineralogical characterization of some potential Graphite deposits of La-Lamdak (Bopi) and Taliha, Arunachal Pradesh; Beneficiation study of the materials by known techniques; Determination of suitability of the products for using in various industries</p> <p>Salient Features The graphite collected from Bopi, Arunachal Pradesh crushed below -210µm size and was used for beneficiation study by gravity separation (dispersion cum settling) method. Dispersion of 0.5%, 5%, 10%, 15%, 20% and 25% slurry concentration of raw graphite using distilled water as dispersion medium were carried out with various settling time and various basic pH. A fixed carbon of 47.17% with 84.15% recovery has been obtained by using 10% slurry concentration at pH 10 with 5 min settling time. On addition of different doses of sodium silicate viz 0.005gm, 0.01gm and 0.02 gm on 10% slurry concentration at various pH no any enhancement on beneficiation was seen as obtained from only distilled water at pH10. The highest fixed carbon of 44.66% with 77.60% recovery has been obtained by using 0.01 gm of sodium silicate to the 10% slurry concentration of graphite at 5min settling time and pH 10. Beneficiation of graphite by chemical leaching</p>

method at different temperature using different alkali was also studied. A highest fixed carbon of 34.16% with 68.11% recovery of graphite has been obtained by this method using NaOH at 5% alkali concentration.

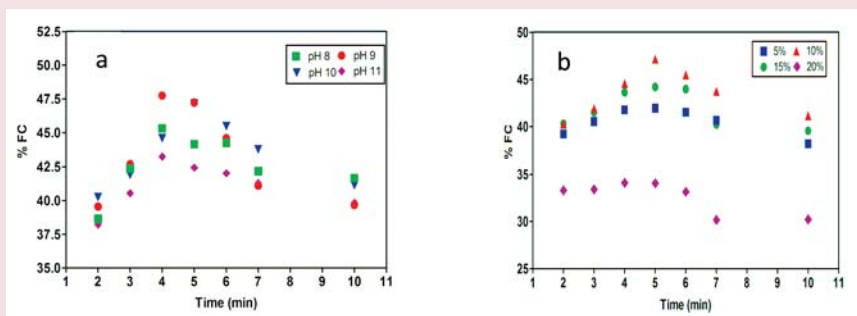


Fig. Variation of fixed carbon with time at (a) 10% slurry conc. at various pH and (b) Various slurry conc. at pH10

Beneficiation of the graphite sample collected from Bopi, Arunachal Pradesh was investigated by flotation study at Indian School of Mines, Dhanbad. The graphite sample of size fraction -425μ and -75μ was used for this study. The beneficiated sample was collected at different time interval viz 45, 85 and 300 min. The ash content of the sample was found to be 74.86%, 65.98% and 59.32% at 45, 85 and 300 min, respectively for -425μ sample. Similarly the ash content of the -75μ sample was found to be 72.27%, 71.44% and 71.57% at 45, 85 and 300 min, respectively.

GAP

PI-
Dr Sekh Mahiuddin

Member-
Dr Manash R Das

Funded by:
DST, New Delhi

Ion specificity on the adsorption of well defined organic acids/anions at the solid/water interface

Objective

To study the adsorption kinetics and isotherms of a series of DHBA (2,3-DHBA; 2,4-DHBA; 2,5-DHBA; 2,6-DHBA; 3,4-DHBA and 3,5-DHBA having $-\text{COOH}$ and phenolic $-\text{OH}$ at different positions) onto alumina and hematite in the presence of Hofmeister ions at function of pH of the medium and temperature of the aqueous phase. To study the surface complexation of a series of DHBA (2,3-DHBA; 2,4-DHBA; 2,5-DHBA; 2,6-DHBA; 3,4-DHBA and 3,5-DHBA having $-\text{COOH}$ and phenolic $-\text{OH}$ at different positions) onto alumina and hematite in the presence of Hofmeister ions using (DRIFT/ATR) FTIR under different pH and correlate with the dissolution of the mineral oxide and (oxy)hydroxide.

Salient Features

Adsorption kinetics of 2,3-DHBA onto the alumina surface in the presence of different ions were measured at pH 5, 298.15 K at a fixed concentration (10 mM). A typical plot is shown in Fig. 1. It is observed that adsorption density of 2,3-DHBA in the presence of anions follows the order: $\text{SO}_4^{2-} < \text{HCOO}^- < \text{Cl}^-$ and exhibit specific ion series effect. The adsorption isotherms of 2,3-DHBA onto the alumina surface at different pH in the presence of different ions at 10 mM concentration are shown in Fig. 2. The specific ion effects on the adsorption density of 2,3-DHBA onto the alumina surface are in tune with the kinetics.

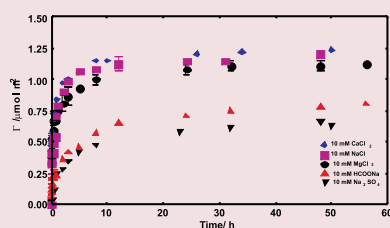


Fig.1 Adsorption kinetics of 2,3-DHBA (C_0 , 0.05 mM) onto alumina surface in the presence of different ions at pH 5 and 298.15 K.

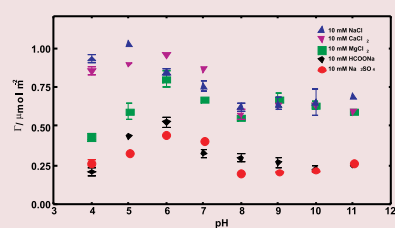


Fig. 2 Adsorption isotherms of 2,3-DHBA onto alumina surface in the presence of different ions at 298.15 K: concentration of 2,3-DHBA was varied.

GAP

Emissions from coal based industries-development of predictive models

PI-
Dr B P Baruah

Member-
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Dr Binoy Kumar Saikia
Mr Prasenjit Saikia
Mr Dilip Kumar Dutta
Mr Tonkeswar Das

Funded by:
Ministry of Coal, Govt. of India

Objective

- To quantify the particulate matter (SPM, $PM_{2.5}$ and PM_{10}) and toxic gas emissions from coal mining and utilization industries.
- Chemical characterization and mass size distribution of particulate matter ($PM_{2.5}$ and PM_{10}) from coal based industries.
- Evolving relationship between the coal quality parameters and emissions.
- Identification of the factors that contribute towards emission of particulates (SPM, $PM_{2.5}$ and PM_{10}) and toxic gases depending upon the type of mining methodologies and utilization technologies.
- Emission inventory for coal based industries.
- Modeling and suggestive measure to regulate the emission from coal mining and utilization industries like coke ovens, mining etc.

Salient Features :

Emissions during coal and biomass combustion: The combustion of North eastern coals shown that the particulate matter collected contained the inorganic species like Fe, Mn, Cu, Cr, K, Pb, Ca, Cd, NO_3^- , SO_4^{2-} , NH_4^+ . The concentrations of calcium and potassium were found higher during the combustion and carbonization of biomass rather than that of coal. Similarly, concentrations of ions like SO_4^{2-} , NH_4^+ were also estimated. Concentration of trace elements in particulate matter is due to the presence of the minerals like pyrites, galena (PbS), clausthalite, siderite, calcite, chalcopryrite ($CuFeS_2$) of terrigenous origin in coal. The data generated will update the emission inventory of trace elements and other particulates in the environments. Biomass combustion also showed the presence of Mn, Cr, Cu.

Emissions near mine sites: The SPM (Suspended Particulate Matter) and RSPM samples (Respirable Suspended Particulate Matter) collected near the Open Cast Mine site of Assam. The average concentrations of SPM and RSPM in the range of $230 \pm 246 \mu g/m^3$ and $272 \pm 228 \mu g/m^3$ respectively The average ratio of RSPM/SPM was 0.84 ± 1.0 .

The gas samples from NER coal mine site showed the presence of SO_2 , NO_2 and NH_3 (Fig.). Concentration of NO_2 was higher than that of SO_2 and NH_3 . Mines using equipment powered by diesel engines, carrying out explosive blasting operations and performing extensive arc welding and/or cutting work are considered to be the general source for the release of NO_2 . Gaseous and particulate samples collected from the coal mine areas

showed the presence of NH_3 , SO_4^{2-} and NO_3^- . The sulfate concentration in both $\text{PM}_{2.5}$ and PM_{10} considerably predominant over the ammonium concentration in the mine site (Fig.) probably due to the presence of number of coke ovens near the colliery while the concentration of ammonia released is too low to neutralize the sulfate concentration. In the mine site the ammonia concentration is in between $0.082 - 0.746 \mu\text{g}/\text{m}^3$ (Fig.) and that of sulfate is in the range $6.06 - 13.86 \mu\text{g}/\text{m}^3$ (Fig.) while at ambient air ammonium concentration varied in between $1.46 - 5.40 \mu\text{g}/\text{m}^3$ and sulfate concentration is in between $0.01 - 0.086 \mu\text{g}/\text{m}^3$ (Fig.). High amount of ammonia at the background sampling site may also be due to a number of cattle shed nearby the area.

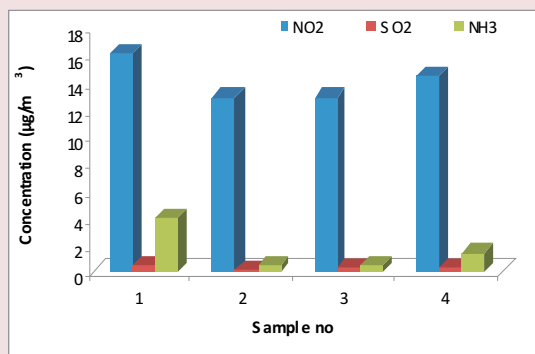


Fig: Comparison of concentrations in $\mu\text{g}/\text{m}^3$ of gases like NO_2 , SO_2 , NH_3 collected in the mine site

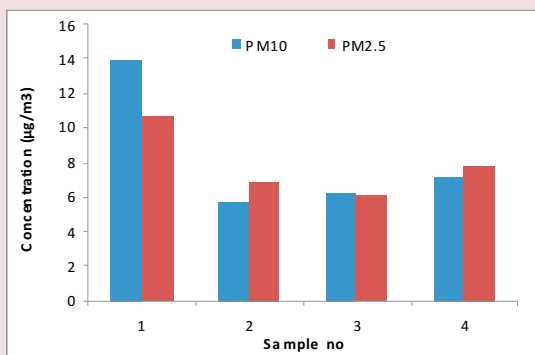


Fig. Showing comparison of concentration ($\mu\text{g}/\text{m}^3$) Vs Sample no. for sulfate in PM_{10} and $\text{PM}_{2.5}$ collected in mine site.

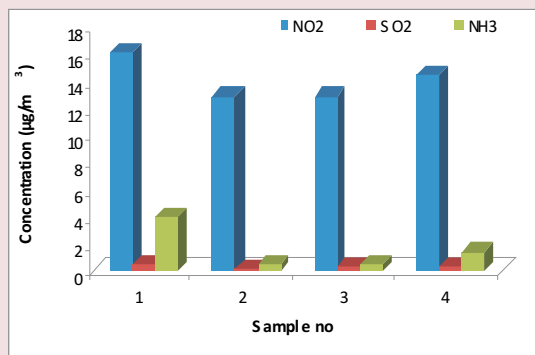


Fig. Showing comparison of concentration ($\mu\text{g}/\text{m}^3$) Vs Sample no. for ammonium ion in PM_{10} and $\text{PM}_{2.5}$ collected in mine site.

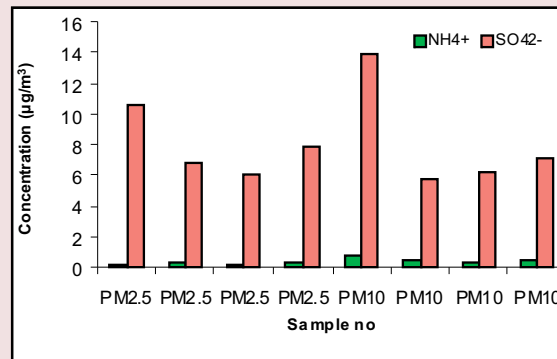


Fig. Comparison of concentration ($\mu\text{g}/\text{m}^3$) Vs Particulate matter (PM) of $\text{NH}_4^+/\text{SO}_4^{2-}$ in PM_{10} and $\text{PM}_{2.5}$ collected in mine site.

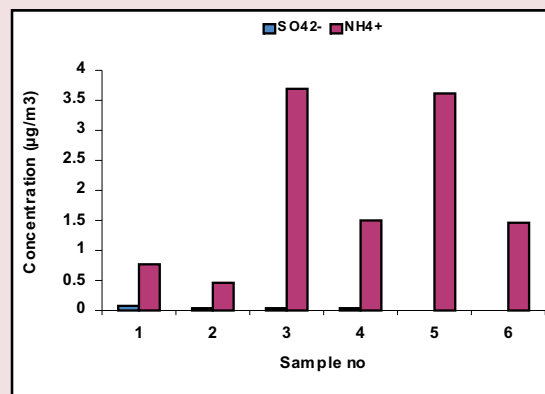


Fig. Comparison of concentration ($\mu\text{g}/\text{m}^3$) Vs Sample no. for NH_4^+ and SO_4^{2-} ion in ambient air.

Gaseous emissions from different sources: Concentrations of gaseous emissions are shown in the Graph below. In gaseous emissions, SO₂ shows higher levels than NO₂ and NH₃ during coal combustion and carbonization, Coal combustion released more NO₂ and SO₂ than wood combustion. SO₂ background concentration was also higher than the SO₂ emitted from wood combustion.

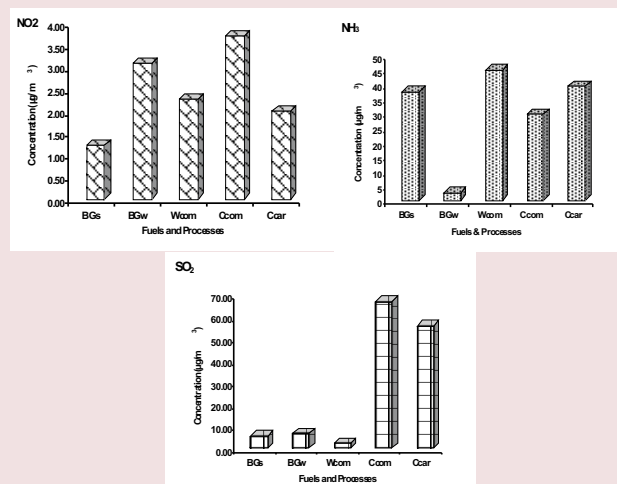


Fig. Inorganic gases released during the combustion, carbonization of wood and coal. W_{com} : wood combustion, C_{car} : coal carbonization, C_{com} : coal combustion, BGs: background summer, BGw: background winter.

Particulate matter emission: Higher release of particulate matter was observed during coal mining, carbonization and combustion of coal. Wood carbonization releases more $PM_{2.5}$ than coal carbonization. Combustion of coal emits more $PM_{2.5}$ as compared to carbonization of coal, while reverses are true for $PM_{2.5-10}$ (Fig.). High concentration of fine particulate matter indicates that nucleation and condensation mechanisms are the primary causes of formation and growth of sub micrometer particles in coal combustion. Agglomeration takes place while coal carbonization, which increases the particle size.

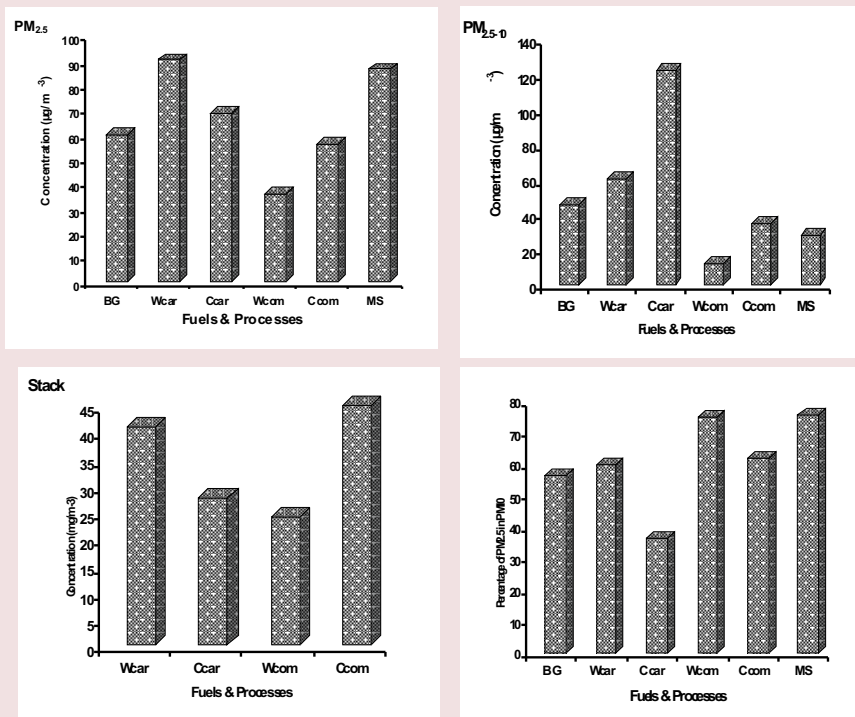


Fig. Mass concentration of particulate matter released during combustion and carbonization of wood and coal. W_{car}: wood carbonization, W_{com}: wood combustion, C_{car}: coal carbonization, C_{com}: coal combustion, BGs: background summer, BGw: background winter, MS; Mine site.

Metal ions emissions from the mine site: The particulate matter in the mine site gas samples collected showed the presence of inorganic species like Fe, Cr, Cu, Ca, As etc (Fig.). The Ca concentration was found higher i.e. 4.3 - 18.4 mg/L while Cu and Cr concentration found very low i.e. in between 0.01 - 0.02 mg/L and 0.02 - 0.04 mg/L respectively. The concentration of Fe was found in the range 0.6 - 3 mg/L. Arsenic (As) was found in the range of 0.04 - 5.4 mg/L among the heavy metals. Particulate matter containing coal fines and dust particles collected. In all the cases, metal concentration in PM_{10} found to be higher than that of the $PM_{2.5}$. Hence, it is evident that the main sources of these trace elements in particulate matter is due to the presence of the minerals like pyrites, galena (PbS), clausthalite, siderite, calcite, chalcopyrite ($CuFeS_2$) of terrigenous origin in coal. The concentration of these trace elements may also be influenced by the presence of coke ovens in the neighbouring areas. The data generated will update the national emission inventory of trace elements.

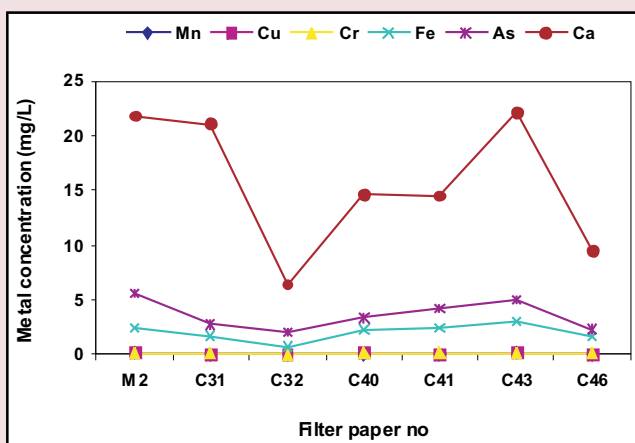


Fig. Metal concentration (mg/L) for different samples collected

Sampling at industrial site: The Sampling and analysis of gaseous emissions from an industrial sites using NEER coals have led to the database for National/regional inventory for coal-based industries.

GAP

Planned development of protocols for utilization of the tide land after analysis of geo-consequences of mining

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CoPI-
Mr Dipak K Bordoloi

Members-
Mr JJ Bora
Mr V Rajkhowa
Mr D Basumatary

Funded by:
DST, Govt. of India

Objective

Zonation of tilla and existing brick field clusters based on soil characteristics. Raw mix design: For conventional burnt clay brick making for each tilla zones, and for making Compressed Stabilized Earth block (CSEB) as an alternative to conventional brick. To establish long term feasibility of the project in terms of economics, availability of land mass and demand of bricks. To develop a feasible protocol for brick production based on environment impact assessment

Salient Features

CSEB were prepared using soil sample collected from Agartala and with other materials like Fine Gravels, Coarse sand etc. with Tara Balram Stabilized Earth block machine. Bricks are prepared varying the stabilizers addition and also other components. The prepared bricks are cured under water at room temperature.

GAP

Synthesis of novel composite material using coir fibre for engineering application

PI-
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CoPI-
Dr T Goswami

Members-
Mr Jayanta Jyoti Bora
Mr Dipanka Dutta
Ms Puspa Kumari Das

Collaborators

CGCRI, Kolkata
PI-
Dr O P Chakrabarti

Objective

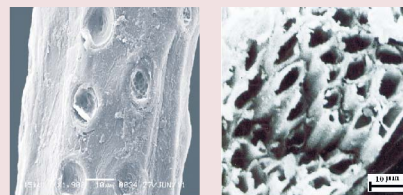
- Development of process for preparation of bio precursors from coir fibre adopting different approaches and optimisation of the process in lab scale. (NEIST-Jorhat Part)
- Development of the process for conversion of coir fibre derived bio precursors to SiC based on composite ceramics. (CGCRI part)

Salient Features

Experiments were carried out to study the structure of both treated and untreated coir fibre with the help of Scanning Electron Microscope (SEM). Study on TGA, XRD and elemental analysis were also conducted. Untreated coir fibres were properly washed with fresh water, dried in an oven and made bundle free with the help of carding machine. The treated fibres were also made bundle free with the help of carding machine and then washed properly with fresh water and dried in sunlight.

Members-
Dr (Ms) Nijhuma Kayal

Funded by:
Coir Board, Min. of Micro, Small,
& Medium Entrepreneurs, Central
Coir Research Institute, Kalavoor,
Alleppey, Kerela



SEM of Coir fibre



Coir fibre board, carbon template and SiC ceramics

GAP

To develop a process of non-glossy borer resistant polymeric composition suitable for application on various bamboo and cane articles

PI-
Dr D Kalita

CoPI-
Dr T Goswami

Members-
Mr Dipanka Dutta
Ms Puspa Kumari Das

Funded by:
SEED Division, DST, New Delhi

Objective

- To develop a process for making a Nonglossy borer resistant polymeric composition suitable for bamboo and cane products which will prevent from damage and decay and attack of borer.
- To create awareness among the rural artisans for improvement of quality in their products so that they can fetch a better price which will help directly in economic upliftment thereby induce the social benefit.

Salient Features

Three species of bamboos were initially taken for the treatment resistant to borer/insects. *Bambusa tulda* (Jati), *Dendrocalamus giganteus* (Mukal), *Bambusa balcoa* (Bhaluka) were collected from the nearby areas of Jorhat district of Assam. The collected species were spitted and cut into the size of 25 cm X 16 cm. Some samples were dried in an oven at $45 \pm 5^\circ\text{C}$ till the moisture content remains to a constant. Both oven dry and green samples were taken separately and treated with different formulations at different ratio. A new borer/insect resistant chemical formulation prepared recently at CSIR-NEIST Jorhat and was also applied to the bamboo samples along with seven other formulations for a comparative study.



Bambusa tulda

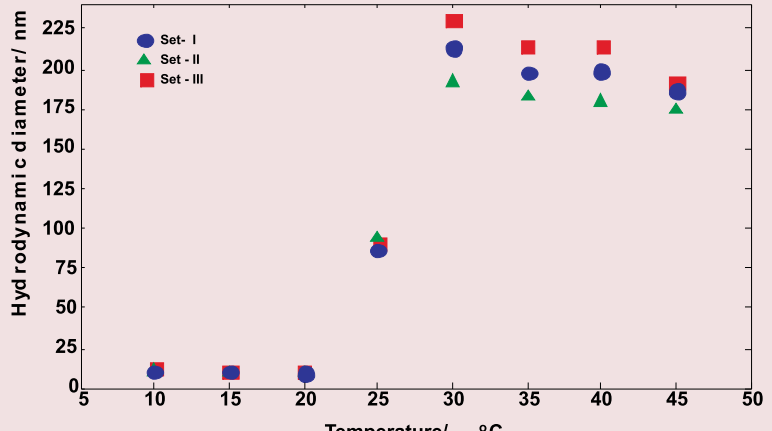
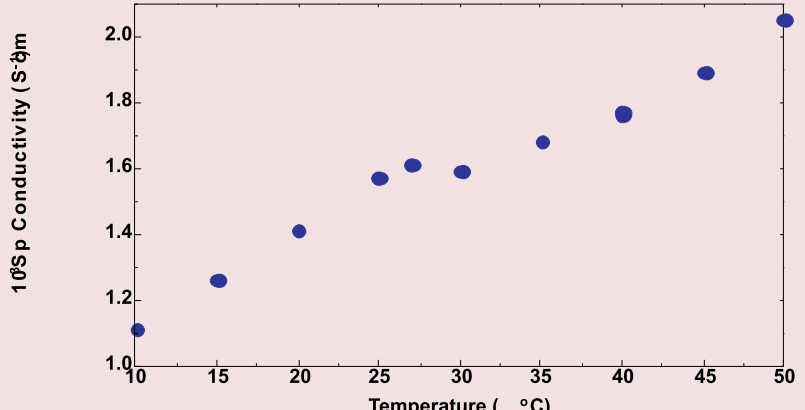


Dendrocalamus giganteus



Bambusa balcoa

GAP	Desulphurization of high sulphur NER coals
<p>PI- Dr B P Baruah</p> <p>Member- Dr Puja Khare Dr Binoy Kumar Saikia Mr Prasenjit Saikia Mr Dileep Kumar Dutta Mr Tonkeswar Das</p> <p>Funded by: Ministry of Steel, Govt. of India</p>	<p>Objective</p> <ul style="list-style-type: none"> • Evaluation/ characterization of sulphur functionalities in high sulphur Assam coals. • Evaluation of effective desulphurization methodologies for quality enhancement with reference to end applications. • Optimization of process parameters for desulphurization of Assam coals. • Removal of mineral matter/ash along with trace and heavy metals from coals during process steps. • Sulphur mapping for NE coals. • Scale up and pilot plant trials. <p>Salient Features</p> <p>The oxidative desulphurisation (ODS) process for Nagaland and Assam coals were carried out in presence of per acids, metal oxides and green solvents. The rate of the ODS for organic sulphur in NE coals was also determined. Kinetic plot for organic sulfur removal is shown in the figure given below.</p> <div data-bbox="763 842 1257 1203" data-label="Figure"> </div> <p><i>Fig. Kinetic plot for ODS with organic sulphur in NE coals.</i></p> <p>Two Monographs on “Clean Coal Initiatives Desulphurization of Fuels; Abstract (1972-2011)” Volumes-I & II have been published.</p> <div data-bbox="574 1364 1428 1951" data-label="Image"> </div>

Collaborative Project	Structural elucidation of reverse microemulsion by fluorescence spectroscopy																																				
<p>PI- Dr Sekh Mahiuddin</p> <p>Collaboration with SN Bose National Centre for basic sciences, Kolkata</p> <p>PI- Dr Ranjit Biswas</p>	<p>Objective To study the structure of water in a confined state (nanopores) of assemblies produced by surfactant mixtures by Fluorescence Spectroscopy and influence of ions on the water structure in the naopores</p> <p>Salient Features A mixture of two surfactants, SDS and CTAB, at 70 and 30 mol%, respectively, known as catanionics, which represent the biological membrane, were studied. The melting temperature of the catanionics is ~ 39 °C. The hydrodynamic diameters of the catanionics were measured in the temperature range of 10 to 45 °C and shown in Fig. The results showed that there is a structural transition, which is also reflected in the conductivity plot (Fig.)</p>																																				
 <table border="1" data-bbox="677 754 1453 1185"> <caption>Data for Hydrodynamic diameter vs Temperature</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Set-I (nm)</th> <th>Set-II (nm)</th> <th>Set-III (nm)</th> </tr> </thead> <tbody> <tr><td>10</td><td>10</td><td>10</td><td>10</td></tr> <tr><td>15</td><td>10</td><td>10</td><td>10</td></tr> <tr><td>20</td><td>10</td><td>10</td><td>10</td></tr> <tr><td>25</td><td>85</td><td>90</td><td>90</td></tr> <tr><td>30</td><td>215</td><td>190</td><td>230</td></tr> <tr><td>35</td><td>195</td><td>185</td><td>220</td></tr> <tr><td>40</td><td>195</td><td>180</td><td>215</td></tr> <tr><td>45</td><td>185</td><td>175</td><td>190</td></tr> </tbody> </table>		Temperature (°C)	Set-I (nm)	Set-II (nm)	Set-III (nm)	10	10	10	10	15	10	10	10	20	10	10	10	25	85	90	90	30	215	190	230	35	195	185	220	40	195	180	215	45	185	175	190
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<p>Inhouse</p>	<p>Development of environment friendly technologies for gainful utilization of high sulphur NE coals</p>																											
<p>PI- Dr B P Baruah</p> <p>Member- Dr Puja Khare Dr Binoy Kumar Saikia Mr Prasenjit Saikia Mr Dilip Kumar Dutta Mr Tonkeswar Das</p> <p>Funded by: CSIR, New Delhi</p>	<p>Objective</p> <ul style="list-style-type: none"> • Development of Environment friendly processes for the coals of NE region • Study of dynamics of elements of environmental concern during mining, processing and utilization of NE coals. • Capacity Building in terms of human resource and research infrastructure. <p>Salient Features</p> <p>Study on nano-mineralogy in NER coals:</p> <p>i) the studies on the particle size distribution (PSD) of the heterogeneous nature of mineral matters in one of the industrially important Assam (India) pulverized coal using computer-controlled scanning electron microscopy (CCSEM) revealed that clay minerals, quartz, pyrite, and pyrrhotite form the bulk of the mineral matter in these coals. Minor minerals, such as calcite, dolomite, ankerite, barite, oxidised pyrrhotite, and gypsum, were also observed. The particle size distribution (PSD) of the included minerals was generally observed to be finer than that of the excluded ones in the coal. As a consequence, the coal rich in included minerals were enriched with small mineral particles, which might affect its reactivity. During laboratory combustion of the coal samples, the concentration of PM₁₀ was found to be higher than PM_{2.5}, distribution of minerals with respect to particle sizes as shown in fig.</p> <div data-bbox="766 1065 1245 1414" data-label="Figure">  <table border="1"> <caption>Data for Fig. Distribution of included and excluded minerals in NER coal</caption> <thead> <tr> <th>Particle size (micrometers)</th> <th>Included (W%)</th> <th>Excluded (W%)</th> </tr> </thead> <tbody> <tr> <td>0.51</td> <td>2.0</td> <td>1.5</td> </tr> <tr> <td>1-2.1</td> <td>4.5</td> <td>4.5</td> </tr> <tr> <td>2.2-6</td> <td>4.5</td> <td>6.5</td> </tr> <tr> <td>4.5-10</td> <td>8.0</td> <td>12.5</td> </tr> <tr> <td>100-210</td> <td>5.0</td> <td>5.0</td> </tr> <tr> <td>210-400</td> <td>6.5</td> <td>4.0</td> </tr> <tr> <td>400-800</td> <td>10.0</td> <td>6.0</td> </tr> <tr> <td>1000-211.0</td> <td>13.5</td> <td>7.0</td> </tr> </tbody> </table> </div> <p>Fig. Distribution of included and excluded minerals in NER coal</p> <p>ii) The attempts were made to make Hyper clean (HPC) and Super Clean (SCC) Coals by removing sulphur and ash from the NER coals.</p> <p>iii) The carbonization of non-caking high sulphur coals for gainful utilization was carried out. The process developed was through Nodulization in presence of organic and inorganic binders and nodules formed were carbonized in non-recovery coke ovens. The carbonized nodules were tested for cement making by the process developed in the laboratory. The carbonized nodules were also found to be suitable as smokeless fuels for domestic applications.</p> <p>iv) Value added products from low graded coals developed and were found suitable for treatments of effluents containing heavy metals and to work as organominerals with soil conditioners.</p>	Particle size (micrometers)	Included (W%)	Excluded (W%)	0.51	2.0	1.5	1-2.1	4.5	4.5	2.2-6	4.5	6.5	4.5-10	8.0	12.5	100-210	5.0	5.0	210-400	6.5	4.0	400-800	10.0	6.0	1000-211.0	13.5	7.0
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- v) Development of pyrolysers for making bio- char from bio-wastes were taken up which good yield of bio-char from bamboo and other wastes.
- vi) Energy efficient and low emission coke ovens were developed for NER coals. The process yielded good quality low ash cokes with less coking cycle.

Synthesis and characterization of Polyaniline (PANI)/fly ash composite : Polyaniline-fly ash (PANI-FA) composites were prepared by oxidative polymerization of. The PANI-FA composites were prepared with different concentrations and thier thermal stability was studied. SEM shows the complexation of metal oxide with emeraldine base of PANI, significantly changing the aggregate state of polymeric molecular chain.

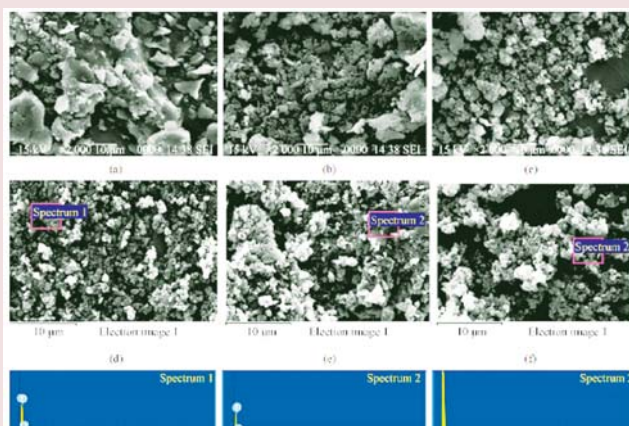


Fig. Scanning electron micrograph (SEM) of chemical synthesized of (a) FA (b) PANI and (c-f) composite of polyaniline-flyash PANI-FA (0.02), PANI-FA (0.1), PANI-FA (0.5) and PANI-FA (1.0), EDXA spectra from (g-i) composite of polyaniline-flyash PANI-FA (0.1), PANI-FA (0.5) and PANI-FA (1.0)

Nano composites with coal waste for CO₂ capture and kinetic study: PANI-coal ash composites prepared for carbon capture using different methods (direct and aging) with different particle sizes coal ash. Pa₁, Pa₂, Pa₃, Pa₄ and Pa₅ were prepared by taking same coal ash of different sizes such as 72BS, 100BS, 200BS, 300BS and 400BS respectively. The order of their stability is Pa₂>Pa₃ >Pa₄ >Pa₁. For carbon capturing, composite Pa₂, Pa₃ and Pa₄ were taken on the basis of their structure and thermal stability.

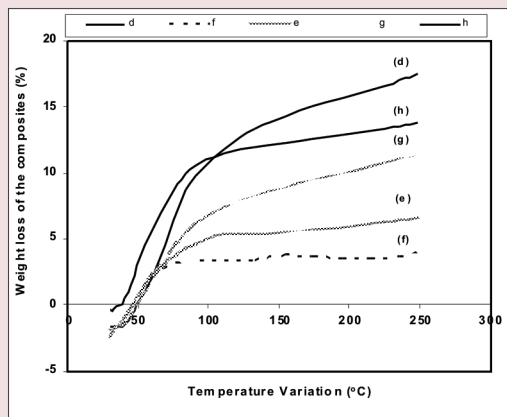


Fig. TGA graphs of PANI, ash and composites in presence of N₂; d-Pa₁, e-Pa₂, f-Pa₃, g-Pa₄, h-Pa₅

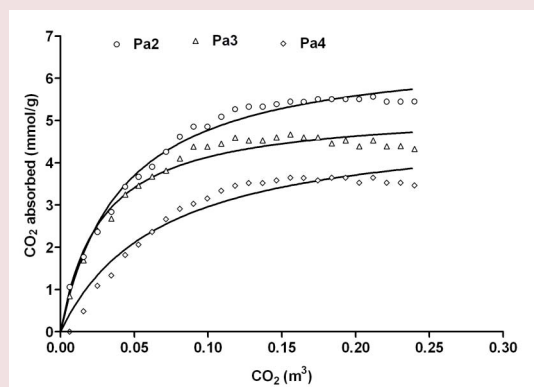


Fig. Variation of concentration of CO₂ adsorbed with CO₂ concentrations

<p>Inhouse</p>	<p>Development of intercalated composites and nanomaterials Part A: development of eco-friendly novel layered matrix based pesticide composites for reducing environmental hazards through optimal and control release Part B: novel hydrotalcite derived nano-oxide coated ceramic monolithic absorbent for treatment of environmentally harmful gases</p>
<p>Part A PI- Dr Dipak K Dutta</p> <p>Member- Dr Pinaki Sengupta Dr Pooja JA Rao, Dr Lakshi Saikia, Mr Dipak K Bordoloi,</p> <p>Part B PI- Dr RL Goswamee</p> <p>Members- Mr Paran Phukon, (Retd) Mr RC Borah, Mr Dipak K Bordoloi</p> <p>Funded by: CSIR, New Delhi</p>	<p>Objective To study the adsorption kinetics and isotherms of a series</p> <p>Part A</p> <ul style="list-style-type: none"> Development of ecologically acceptable Pesticide-Clay composites containing Chloropyrifos (Dursban), quinolphos etc. for reducing environmental hazards through optimal and control release. To study the effect of different modified Montmorillonite clay composites (metal cations exchanged, intercalated / intersalated, metal nanoparticle supported Montmorillonite clay composites etc.) on the catalytic decomposition (hydrolysis / oxidation etc.) of different types of pesticides/ herbicides and other similar organic compounds. Systematic study on optimization of adsorption/interaction of different pesticides on modified Montmorillonite clay and determination of pesticide release/leaching from the pesticide-clay composites to water/soil and bioactivity in soil <p>Part B</p> <ul style="list-style-type: none"> To design and prepare some novel oxidic absorbents/catalysts from composites of anionic and cationic clays, supported and coated on some ceramic substrates To study the effectiveness of these coated substrates to treat environmentally harmful gases like SO₂, H₂S, N₂O, NO_x etc. To study the regeneration / reusability of these oxide coated ceramic substrates <p>Salient Features Activity A Adsorption and Controlled Release of Chloropyrifos over Modified Montmorillonite Clay: The adsorption of organophosphorous pesticide such as chloropyrifos of different concentration on homoionic Montmorillonite clay (Na-Mont and Ca-Mont) has been studied. Activated homoionic Na-</p>

Mont on interacting with 50 ml of 250 ppm pesticide solution exhibited about 20 % adsorption, while, the adsorption on acid treated Montmorillonite (H^+ -Mont) was around 67 %. The adsorption on Na-Mont is attributed to the residency of the pesticide within the interlamellar layers present in it, whereas in case of H^+ -Mont, the adsorption occurs into the micro- and mesopores available. Homoionic Na-Mont adsorbs the least amount of pesticide, while H^+ -Mont (4 hrs.) shows the highest amount of adsorption and also pH dependent. At lower pH (5) higher amount of adsorption was observed. The release of pre-adsorbed pesticide from the clay-pesticide composites was determined for different time intervals (1 to 7 days) at ambient conditions. The release is also pH dependable i.e. higher the pH higher is the rate of release.

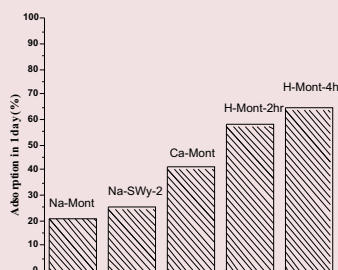


Fig. Adsorption of chloropyrifos (CPP) on different modified Mont.

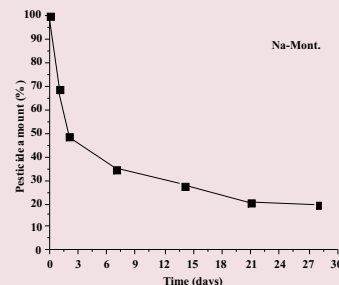


Fig. Pesticide quantity after release from Na-Mont-CPP composite (CPP) on different modified Mont.

Montmorillonite supported Ni^0 -nanoparticles catalyst for one-pot synthesis of Hantzsch polyhydroquinoline: Modified Montmorillonite supported Ni^0 -nanoparticles were generated in-situ and characterized by XRD, HRTEM (Fig.) Surface area measurements etc. The supported Ni^0 -nanoparticles were employed as catalyst for green and efficient multicomponent one-pot synthesis of Hantzsch polyhydroquinoline by the condensation of aldehydes, dimedone, ethylacetoacetate and ammonium acetate at room temperature. The well dispersed Ni^0 -nanoparticle such as easy removal of the catalyst, solvent-free, shorter reaction time, high product yields (about 95 %) and easy work up procedure. Scheme.

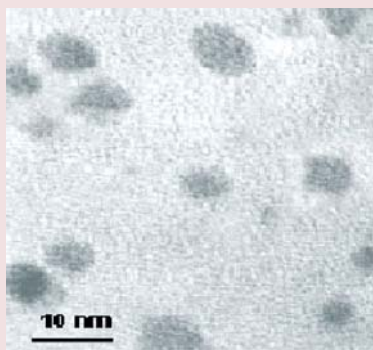


Fig. TEM image of Ni^0 -nano particles on modified Montmorillonite before reaction

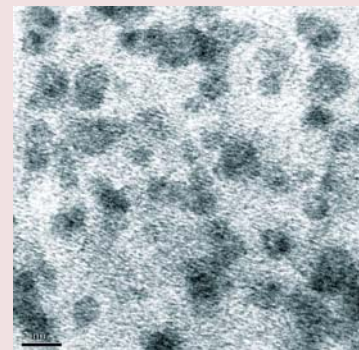
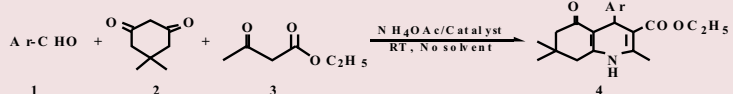


Fig. TEM image of Ni^0 -nanoparticles on modified Montmorillonite after reaction



Scheme

Activity B:

The toxic gas emission device developed is capable of removing sulphur bearing components from a gas mixture at high temperature from very low concentration in ppm level with a very high Specific Desulfurisation Efficiency. The main advantage is that the devices can be reused and is environmentally benign.

Inhouse

Evaluation of certain non-conventional plant material of NE Region for manufacturing value added products.

- a) Development of technology for extraction of fibres for making yarns and fibres (Lab scale)
- b) Development of technology for extraction of natural dyes from flowers and herbs. (Lab scale)

PI-
Dr T Goswami

CoPI -
Dr D Kalita

Members-
Mr Dipanka Dutta
Ms Puspa Kumari Das

Funded by:
CSIR, New Delhi

Objective

- Development of process for extraction of fibres from agrowaste and forest weed available in NE region.
- Development of cottage scale technology for manufacturing ropes, twines, decorative handicraft items and fibres for handmade paper based on the available fibre resources

Salient Features

- Under the above project five non conventional plants viz *Hibiscus cannabinus*, *Hibiscus esculentus*, *Alpinea allughas*, *Hibiscus sabdarifa* and *Cannabis sativa* were taken up for investigation on extraction of fibres and development of value added products. The fibres were extracted by mechanical, chemical and manual process followed by bleaching and softening operation. Out of the five plants the fibres extracted from *H. esculentus*, *A.allughas* and *H. sabdarifa* showed better fibre yield and quality with higher physical strength properties. The chemically extracted fibres of *A. allughas* and *H. cannabinus* may be a potential source of fibres for ropes and twine making. Optimization of process of extraction of fibres has been standardized in lab scale.
- Development of process for manufacturing speciality handmade paper utilizing the pulps of *A. allughas* and *H. sabdarifa*. The paper made out of the pulp of these plants showed better tensile and bursting strength. Hence the pulps of above plants may suitably be used for the manufacture of good quality paper of adequate strength, which can be used for normal and heavy duty packaging. The process of preparation of pulp stock and handmade paper making has been standardized in lab scale.

<p>Consultancy</p>	<p>Techno-economic feasibility studies for manufacture of coke-breeze from Nagaland coal, Teunsang District</p>
<p>PI- Dr B P Baruah</p> <p>Member- Dr Puja Khare Dr Binoy Kumar Saikia Mr Prasenjit Saikia Mr Dilip Kumar Dutta Mr Tonkeswar Das</p> <p>Funded by: DGM, Govt. of Nagaland</p>	<p>Objective Carbonization of low rank coal</p> <p>Salient Features Techno-economic feasibility studies for manufacture of Coke Breeze are taken up jointly with Directorate of Geology and Mining, Nagaland, Dimapur. Present work deals with the techno economic study for conversion of non caking Nagaland coals to carbonized nodules for gainful industrial utilization. Two number of coal samples slightly coking to non-caking. Scale also produced pencils of a good quality coke from sample K-S1. The sample K-S2 did not yield good quality pencil, which were friable and not suitable for coke. Direct carbonization of coal samples could not produce a better quality developed coke suitable for industrial use; agglomeration/Nodulization of coal fines is an efficient process to convert this coal to an energy source in the industrial as well as domestic sector. Lab scale photographs are shown in figures.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="645 894 910 1099">  <p>Green Nodules of Konya Coal</p> </div> <div data-bbox="923 894 1187 1099">  <p>Carbonized Nodules of Konya Coal</p> </div> <div data-bbox="1194 894 1511 1099">  <p>Nodules</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div data-bbox="645 1170 1067 1278">  <p>Pencil formed during Carbonization of Coal Sample</p> </div> <div data-bbox="1120 1164 1460 1278">  <p>Pencils formed during High Temperature Carbonization of Coal</p> </div> </div> <p style="text-align: center;"><i>Fig. Products during different activities</i></p>
<p>Consultancy</p>	<p>Feasibility studies for manufacturing of soil conditioner from coal and coal waste</p>
<p>PI- Dr B P Baruah</p> <p>Member- Dr Puja Khare Dr Binoy Kumar Saikia Mr Prasenjit Saikia Mr Dilip Kumar Dutta Mr Tonkeswar Das</p> <p>Funded by: DGM, Govt. of Nagaland</p>	<p>Objective for agricultural application of low grade Nagaland coal and coal waste</p> <p>Salient Features Physico-chemical properties of two numbers of coal samples (S.C.M-I & S.C.M-II) from Northern Mongchen Coalfield, Nagaland were used for this study. Oxidation of these low grade Nagaland coals yielded humic acid and its derivative, suitable for soil conditioning by introducing humic substances which also increases porosity, water retention and with enhance crop yields. The derivatives are also useful for treatment of effluents containing heavy metals</p>



0.211mm coal samples (S.C.M.-I & S.C.M.-II)



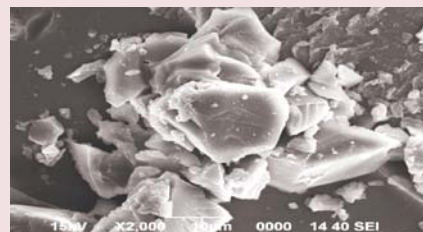
Magnetically stirred under ice cool condition



Oxidised coal samples (S.C.M.-I & S.C.M.-II)



Humic acid residue from coals



SEM micrograph of humic acid

Fig. Humic acid preparation from NE coals

S&T Facilities Installed

Chemical Engineering Division

- Ion Chromatography (Metrohm)
- Diode Array NIR-Near Infra Red (Perten Instruments)
- UV –Vis Spectrophotometer (Perkin Elmer)
- Rapid Visco Analyser (Perten Instruments)
- Food Texture Analyser
- Laboratory Spray Dryer
- Microwave assisted extractor
- Microwave assisted convective dryer
- Milli Q water
- Automatic Digital Polarimeter

Coal Chemistry Division

- Flue Gas Analyzer (CO₂, SO₂, CO)
- Microwave Digestor
- Remi Mechanical Stirrer (20 Litres capacity)
- Low carbon emission New Designed Coke Oven
- Water quality assessment equipment
- On line Gas Connection in the laboratory as per internationally accepted code

Materials Science Division

- Thermal analyzer– Model Q600
- Digital Flame Photometer-Model 128 (Systronics)

Petroleum & Natural Gas division

- Automatic Distillation Unit to study the distillation characteristics of petroleum products.

Synthetic Organic Chemistry Division

- Flash Chromatography

Substation, Imphal, Manipur

- Toe Lasting machine
- Heel Lasting machine
- Counter Moulding machine
- UV-Vis-Spectrophotometer
- Video conferencing

Societal Activities

Health awareness programme held under International Women's Day celebration

CSIR-NEIST organized a one-day health awareness programme for women under the auspices of International Women's Day celebration on 5 March, 2012 at Sri Sri Pitambardeb Goswami Primary School, Namoni Gayan Gaon, Jorhat. Dr P G Rao, Director, CSIR-NEIST chaired the programme, wherein Dr C B Dowerah, Sub Divisional Medical & Health Officer and Mrs P Yasodhara Rao, President of Ladies Club, CSIR-NEIST attended as the Chief Guest and Invited Guest respectively. Speaking on the day, Dr Rao briefed about the significance of International Women's Day celebration and various activities organized by CSIR-NEIST every year under the banner for the benefit of its women staff members as well as the society at large. He said that malnutrition is very common in rural areas hence proper diet and nutrition is essential for the people. In this connection, he mentioned about the edible mushroom cultivation of CSIR-NEIST which is a nutritious and protein rich food. It is to be mentioned that his address was translated to Assamese by Mrs Alakananda Sengupta, Sr Principal Scientist. Dr Swapnali Hazarika, Scientist & Convenor of the organizing committee briefly highlighted the various activities of CSIR-NEIST towards societal development in the secretarial address.

Dr Dowerah delivered lecture on "Immunisation and health care for mother and child". He talked about the WHO/UNICEF/Europe Commission/NRHM supported programmes and community awareness and epidemic control in general. A technical session followed which included two awareness lectures delivered by Mr Ananta Sarmah, Principal Technical Officer, CSIR-NEIST on "Water is Life" indicating water related general health and hygiene and by Dr Kiran Tamuly, Senior Medical Officer, CSIR-NEIST Clinic on "Awareness on Women Health".

Nearly 150 people from Namoni Gayan Gaon attended the programme. The programme also included free health check up for women in which a total of 84 ladies availed registered for check up of height, weight, blood pressure, blood sugar, blood haemoglobin and general health. The check up was done by Dr P K Baruah and Dr T Bora, Senior Medical Officers, CSIR-NEIST clinic and they were assisted by Ms R Kalawar, Ms M Pegu and Mr



Dr P G Rao, Director, CSIR-NEIST, speaking at the Inaugural function. Also seen seated on the dais is, Mrs P Yashodhara Rao, President-Ladies club, CSIR-NEIST & invited guest.



A Section of audience attending the programme.

D Ojha of CSIR-NEIST clinic. Mr U N Bodoloi, ex-NEIST clinic staff and presently associated with Indian Institute of Technology and Jorhat Institute of Technology along with his students from both the institute conducted the sugar and haemoglobin test of blood samples drawn from the registered participants. Besides this, the attendees were provided free medicines which were distributed by Franco India Limited and CSIR-NEIST clinic.

The "workshop & training on sericulture for healthy

Workshop on Sericulture for Healthy Larvae and the Production of Quality Muga Silk held

larvae and the production of quality muga silk" sponsored by CSIR- Indian Institute of Chemical Technology, Hyderabad and organized along with CSIR-NEIST was held at Hotel Brindavan in Sivasagar, Assam during 25 to 27 July 2011. The workshop was organized under the project 'Implementation of new technology and training program for rural development in sericulture at North-East states of India- Assam and Manipur' sponsored by CSIR in the 11th 5 year plan to IICT, Hyderabad. The objective of the program was to provide training to farmers in the area of sericulture especially in muga culture in the NE region. Updated information on simple eco friendly and viable technologies developed at laboratory and field level related to sericulture were imparted to farmers. A Terminalia chebula based "Muga Heal" bio-formulation for the control of 'flacherie' disease in muga silkworm and enhanced silk production was also

provided to all the muga farmers by the dignitaries for field level application. IICT Hyderabad along with NEIST has also come in a big way to disseminate the technologies developed for successful and better cocoon production. The resource persons in the training program were Dr B G Unni; Dr U S N Murthy and Dr Sunil Mishra, scientists from CSIR- IICT; Dr K Das and Mr Kartik Neog, scientists from CMER&TI, Lahdoigarh. A field visit was also arranged to a sericulture farm at Central Muga Eri Research & Training Institute, Lahdoigarh for live demonstration on the different eco-friendly techniques for muga sericulture and processing of the silk yarn from cocoons. The farmers expressed their happiness and thankfulness to CSIR for conducting the program as some of them had never undergone such useful training program before.

Training on Mushroom cultivation

Beneficiaries	Organized by	Funded by
84 trainees	North East NGOs' Forum	North East NGOs' Forum
56 trainees	Himalaya NGO	Himalaya NGO
33 trainees	NEIST Jorhat	NEIST Jorhat
61 trainees	DNA Club- Sankardev Seminary School, Jorhat, Assam	DNA Club- Sankardev Seminary School, Jorhat, Assam
43 trainees	ICDS, under Woman Empowerment Scheme, Tirap Dist, Arunachal Pradesh on 24 June 2011	ICDS, under Woman Empowerment Scheme, Tirap Dist, Arunachal Pradesh
56 trainees	IQAC, MDKG College, Dibrugarh, Assam on 29 June 2011	IQAC, MDKG College, Dibrugarh
21 trainees	All Mizoram Farmers Union (AMFU), Aizawl, Mizoram.	All Mizoram Farmers Union (AMFU), Aizawl, Mizoram.
27 trainees	North Eastern Small Scale Industries Association (NESSIA), Jorhat.	North Eastern Small Scale Industries Association (NESSIA), Jorhat
10 trainees	NEIST Jorhat at Ramhari, Mangaldoi	NEIST Jorhat
08 trainees	NEIST Jorhat at Rangia	NEIST Jorhat
03 trainees	NEIST Jorhat at Campus	NEIST Jorhat
52 trainees	DNA Club, Balya Bhavan School	Balya Bhavan School
200 trainees	Harchura tea estate, Tezpur on 7 November 2011	Harchura tea estate, Tezpur
27 trainees	North Eastern Small Scale Industries Association (NESSIA), Jorhat on 23- 24 November 2011	NEIST, Jorhat
06 trainees	NEIST, Jorhat campus	NEIST, Jorhat
47 trainees	Pirakata L P School, Teok, Jorhat on 16 December 2011	North Eastern Small Scale Industries Association (NESSIA)
77 trainees	Patiagaon L P School, Jorhat on 28 December 2011	North Eastern Small Scale Industries Association (NESSIA)
02 trainees	NEIST, Jorhat campus	NEIST, Jorhat
31 trainees	Ajaraguri Jagaran Self Help Group, Jorhat.	NEIST, Jorhat
26 trainees	Sipyard, Arundhoti Nagar, Agartala during 2 -3 February 2012	NEIST, Jorhat

Training on Mushroom cultivation and Vermicompost

- Under “CSIR-800 programme” for popularization of Mushroom cultivation and Vermicompost production in Arunachal Pradesh NEIST Branch: Itanagar, Naharlagun has organized a one day training programme on cultivation of edible mushroom and production of vermicompost at Holongi, Papumpare District collaboration with “Kokilla-Holongi Farmers club” on 13 December, 2011. About 26 women from different SHG of Holongi locality participated in the training

programme. Mr. Kease Tana, Chief Co-ordinator, Kokilla-Holongi Farmers club, Holongi initiated the programme by distributing mushroom spawns free of cost to all the participants.

- Fish Festival cum Kisan Mela at Balijan on 15-16 December 2011 was organized by Krishi Vigyan Kendra, Papum pare and Agri-Allied Dept, Arunachal Pradesh. NEIST Br. Itanagar organized a training programme on Cultivation of Mushroom and Production of Vermicompost in the Kishan Mela.

Exhibition-cum-Training on Mushroom cultivation

The Dony-Polo Yelam Kebang, Arunachal Pradesh organized three days exhibition at Pasighat during 1-3 December, 2011. NEIST Br. Itanagar organized a programme to participate along with NEIST Jorhat in

exhibition stall in these days and described our rural activities in Arunachal Pradesh. A training programme was organized on cultivation of edible mushroom to different visitors in the stall

Training to the trainees of Jorhat Zila Parishad conducted



Dr A K Bordoloi, PTO, along with the trainees

training programme of Jorhat Zila Parishad held during 12-31 August, 2011 on household chemicals and aromatic & essential oil products. The experts from CSIR-NEIST included Dr M J Bordoloi, Sr.Principal Scientist; Dr Tridip Goswami, Sr. Scientist; Dr A K Bordoloi, PTO; Dr S P Saikia, Scientist & Mr H Lekhok, TO and Dr Dipul Kalita, Scientist who imparted training on “Bleaching powder technology”, “Possibilities of employment generation through production of low dust chalk pencil and liquid deodorant cleaner”, “Mushroom cultivation”, “Citronella and other aromatic plant cultivation, distillation of oil and processing” and “Banana fibre processing and handmade paper making” respectively. The training was attended by as many as 27 trainees comprising of unemployed youths.

At the request of General Secretary, North Eastern Small Scale Industries Association (NESSIA), CSIR-NEIST imparted training to the trainees of the self employment

Workshop on sericulture development

About 37 farmers participated in the programme. The program was inaugurated by L Jayentakumar Singh, Minister, Health & Family Welfare, Manipur. Dr PG Rao, Director, NEIST, Jorhat presided the function. Dr USN Murty, L Haokip, Addl. Director, Sericulture, Manipur, Dr K Chaoba, Scientist, RTRS & Dr HB Singh, Scientist-in-Charge, Substation, Imphal were on dais. The programme was organised by CSIR-NEIST Substation, Imphal in collaboration with IICT, Hyderabad & CSIR-NEIST, Jorhat



Dignitaries on dais

Demonstration and training on banana fibre extraction and manufacturing low dust chalk pencil.

Date : 1-4 February, 2012
 Sponsored by : Tripura State Council for Science and Technology and CSIR Lab.
 Beneficiaries : 74 participants mostly rural woman.
 Salient features :
 Demonstration for extraction of banana fibres by chemical and manual methods were imparted to the

participants mostly rural woman. The process for bleaching and dyeing of the chemical fibres were also explained and demonstrated. The ropes and twine making and different handicraft items using banana fibre were explained to the participants during the training programme. Preparation of low dust chalk pencil was explained and demonstrated to the participants.

Demonstration and training on manufacturing liquid deodorant cleaner and low dust chalk pencil.

Date : 21-24 December, 2011
 Sponsored by : NESSIA
 Beneficiaries : 10 participants.
 Salient features :
 Demonstration for manufacturing liquid deodorant cleaner and low dust chalk pencil were imparted to the

participants. Properties of different chemicals used in the process were explained and the list of manufacturers/distributors of those chemicals were given to the participants. All the processing parameters of both the process were covered in the training programme.

Demonstration and training on banana fibre extraction and manufacturing low dust chalk pencil.

Date : 29 June, 2011
 Sponsored by : Monohari Devi Kanoi Girls College.
 Beneficiaries : 60 woman participants from different NGO & SHG of Dibrugarh
 Salient features :
 The extraction of banana fibres by chemical and manual

method were demonstrated to the participants along with a lecture on "Fibre processing and product development from banana fibres" to the entrepreneurs. The process for manufacturing low dust chalk pencil was also explained and demonstrated to the participants.

R&D Support Activities

Human Resource Development

The HRD Division is contributing in its endeavours on human resource development and knowledge management solutions, realizing R&D output of the institute. The Division was instrumental in catering to the needs and aspirations of the students and teachers of NE-Region in particular and the country in general for imparting training, motivating and improvising R&D infrastructure to ever-increasing clientele of the institute. The Division undertook extensive activities on record management of the employees and researchers, competences development through need based training, nomination for scientific awards, International collaboration etc., which brought along due national and international exposure. The following structured processes were carried out involving Engagement & Induction, Competency Enhancement, Motivation & Training, and Learning & Development for achieving the objectives of the institute.

Structured and customized induction process and S & T management

Project Workers: In order to support and manage the project activities of CSIR and external funding agencies, an open and flexible manpower requirement is a must which is also one of the most important components of the projects. External manpower thus engaged, helps in achieving the targets of R&D projects. Realising the importance of proper human resource towards successful implementation and completions of the projects, the Division customised process for attracting young talents in different areas of science to this Institute through different means and had empanelled sufficient numbers of talented candidates with desired specializations on merit basis. The empanelled candidates were engaged, as and when required, in externally funded and CSIR projects of the Institute as well as at its Sub-station, Imphal. During the year 29 Projects Assistants were engaged to assist the scientists for continuing the project activities and altogether, 110 Projects Assistants worked in different projects of the institute. Moreover, some of the Project Assistants engaged in earlier years were permitted to

pursue research work leading to Ph D degree based on review of their progress of research work.

Research Workers: The Division focuses and encouraged, grooming of young talents to unleash their potential to successfully qualify the fellowship scheme of CSIR and other funding bodies. This in-turn provided highly skilled manpower to carry out basic research in frontier areas of science. The institute has been able to attract talents not only from the country but also from abroad like Egypt and Nigeria for carrying out research activities. During the year a few researchers, selected at national and international level in fellowship scheme joined the Institute. Presently, they are working as Principal Investigator (PI) under Women Scientist Scheme (WSS) of DST, Senior Research Fellow and Junior Research Fellow of CSIR, UGC and other funding bodies. The Institute inducted Scientists and Research Fellow under Quick Hire Scheme of CSIR, DST-SERC-Fast Track YSS Scheme also as DST Inspire fellow, CSIR-TWAS Fellow, DBT-TWAS Postgraduate Research Fellow and DBT-TWAS Postgraduate Research Fellow and Research Training Fellowships for Developing Country Scientists (RTFDCS) in order to augment the research activities. The Division also arranged to engage a few lecturers, teachers and officials of nearby colleges and other Institutes as Guest Workers for their research work leading to PhD. The progress of work of the research fellows were monitored and reviewed in specified time frame for taking up corrective measures and based on the recommendation of the designated authority the fellowship was upgraded or extended from time to time. The above activities were supported with proper record keeping and correspondence with HRDG – CSIR, DST – New Delhi, UGC – New Delhi, etc. The following research worker were working during the period: Quick Hire Fellow (QHF) = 04, Senior Research Fellow = 13, Junior Research Fellow = 07, Principal Investigator, DST Women Scientist Scheme = 04, DST-SERC-Fast Track YSS Scheme = 01, CSIR-TWAS Fellow = 02, DBT-TWAS Postgraduate Research Fellow = 01, DST Inspire fellow = 03 Teachers Fellow = 01, Lady Tata Memorial Jr.

Scholarship = 01 and DBT-TWAS Postgraduate Research Fellow and Research Training Fellowships for Developing Country Scientists (RTFDCS) = 01.

Apprentice Training Programme: Apprenticeships are a powerful vehicle for skill development because they facilitate “learning by earning” and “learning by doing”. The institute is continuing skill development technical training programme for educated youths of the state under Apprentice scheme of Govt of India. The Division coordinated various activities of the training programmes for Graduates and Diploma holders in engineering disciplines and Apprentice training programme and during the year, 1 Diploma holder engineers joined this institute. Under Trade apprentice training programme, 10 ITI qualified candidates in different trade like draughtsman, electrician, welder, fitter, electronic mechanic, plumbers, etc and 2 in laboratory assistant trade were engaged in the institute. The duration of the training period ranged from one year to three years. During engagement, registration, imparting training and also in examination process the Division interacted with Board of Practical Training-Kolkata, Directorate of Technical Education-Assam, and other organisations.

Research Worker under Academy of Scientific and Innovative Research (AcSIR): The Academy of Scientific and Innovative Research (AcSIR) has been established by an ordinance of Govt of India under Academy of Scientific and Innovative Research Act, 2010. This was further passes by both house of parliament on December 27, 2011. The Academy has been declared as an institution of national importance and is established for furtherance of the advancement of learning and prosecution of research in the field of science and technology in association with CSIR. The objective of the Academy is to disseminate advanced knowledge in science and technology, by providing teaching and research facilities in emerging areas and conduct courses in, and integrate into its courses, interdisciplinary and multi-disciplinary areas covering natural sciences, life sciences, mathematical and computational sciences, medical sciences, engineering, applied art, humanities, social sciences, law relating to these areas and interfaces thereof.

The Division is the functionary unit of AcSIR in the institute and have actively participated in formulation and structured activities of AcSIR, like course curriculum preparation, registration of students, constitution of Doctoral Advisory Committee (DAC) etc. Presently, 7

Junior and Senior Research Fellows are enrolled in AcSIR Ph D programme in this institute.

Training Programme / Project Work for the Students of different institute/universities

The R & D activities and linkage between our institute's with external research environment will definitely add value to our system. Enduring this need the Division was successful in enhancing linkages / networking with other organizations / academic institutions for HR development towards fostering research in different branches of science. The Division had arranged facilities for multi-theme and multi-level training programme like: summer training, industrial training, practical training, dissertation, etc. to selected students of different universities, colleges and institutes of the country. The modules for these programmes were designed, evolved & formulated in-house keeping in view the institutional scientific pursuit and career needs. At the request of the authorities of universities, colleges and other institutions and also the students, this institute permitted the students to undertake training programme under a scientist. The duration of the programme ranged from one month to one year and after successful completion of training / dissertation, certificates were issued. During the year 125 students at different levels up to postgraduation were permitted to work in the institute, out of which 99 students actually undertaken the training programme / project work. The Division was also instrumental in engagement a few of IASc-INSA-NASI Summer Research Fellows of different colleges of the country. Through our analysis of the customised processes and subsequent interaction with students, we found that our system had effectively contributed to the R&D output in the research network and we were able to motivate the students to focus on creativity rather than precise execution.

Training for Scientist and Officials, outside NEIST-Jorhat:

Training and re-training is a process for developing human resources continuously. In the multi-facet area, the Division regularly interacted with HRDC, CSIR and also with other institutes / organizations for need-based training of scientists and officials of the institute. The Division also helped the scientists and officials of the institute to undertake different training programmes at those organizations. Altogether, 4 number of scientists and 10 number of Technical Officers were nominated to undertake different training programme during the period such as: i). 4th Workshops on Food Safety in Supply Chain for North Eastern India organized by CII, Guwahati, ii) Competency

Development for Technical Officers; iii) Research Methodology: General Statistical Methods; iv) Crafting and Managing R&D Projects, all by HRDC, Ghaziabad, etc.

International Scientific Collaboration: Building relationships and developing collaborative projects with academic and government partners of foreign country is a pre-requisite for sustainable research in frontier areas of science. To remain competitive in the world, we need to target resources and increase our depth of expertise and talent in priority areas of strategic importance for the institute and the country. Professional exchange of scientists is an important tool for cross-fertilization of ideas which helps in formulating bi-lateral and multi-lateral research projects. The Division played an active role and assisted scientists and technologists of the institute for initiating international scientific collaboration. The Division interacted with different organizations for deputing scientists and technologists aboard under exchange of scientists programme, fellowship programme, training programme, participation in conference and symposium, etc. The proposals were examined critically through designated process and the Division interacted closely with ISTAD, CSIR during the process, which also include monthly reporting of foreign visits of scientists and officials. During the year nine (09) scientists & technologist of the institute were deputed 11 times to visit countries like Italy, Spain, United Kingdom, Czech Republic, Thailand, Bangladesh under different programmes.

University linkage to promote research: The regional partnerships and collaboration with universities / institutes is one of the missions of the institute. The institute signed MOU with different research institutes and universities of NE Region with a view to augment the basic research in frontier areas of science and it is also one of the authorised research centre of different universities of the Region. The Division regularly interacted with different Universities of the region regarding Ph D registration, course-work, grading, etc. During the year 9 research workers were awarded Ph D degree by Dibrugarh University, Dibrugarh, Gauhati University, Guwahati and Tezpur University, Tezpur. The following are the details of Ph D awarded during 2011-2012.

Nomination for Awards / Fellowships: The Division coordinated with different organizations and institutions of the country and abroad in sending nomination of the scientists for awards & fellowships of different kind, viz:

“Prasanna Chandra Goswami Award – 2011”; “Professor HC Goswami Fellowship – 2011”; “Hiranya Chandra Bhuyan Award – 2011”; “Indo-US Research Fellowship 2012 in the area of Chemical Sciences”; “CSIR -Young Scientist Awards for the year 2012”; and “North East Best Managers Competition”.

Research Council: The Division carried out different activities of the Research Council (RC) of the institute. During the process it interacted with the scientists and other officials for preparation of RC agenda document and other issues of RC. During the year the 43rd and 44th RC meetings was organized. The 43rd RC was organized during the period from 31st October, 2011 – 1st November, 2011 and the 44th RC meeting was organized during March 7 - 8, 2012. The agenda documents of 43rd and 44th RC meetings were prepared and the approved minutes of the 43rd and 44th RC meetings were circulated among the RC members and also sent to CSIR hqs. Actions to be taken based on the recommendation of the RC meetings were circulated and follow up actions were documented. Also, the “Activities of HRD Division in CSIR-NEIST, Jorhat” was presentation before the RC members during the 44th RC meeting on March 7, 2012.

Database Management: The Division is managing different databases on manpower of the institute. The databases are being regularly updated. Some of the databases are: Foreign visit of scientists, Research workers, Ph D recipients, Manpower, Apprentice trainees, etc. The reports of the databases were being used for taking up effective measures. Some of the reports were sent to different organizations of the country as and when required. The Division continued the assignment in furnishing information of Group IV scientist to RAB, CSIR on half – yearly basis. The Division also continued to assist the Director in different S&T activities.

Right to Information Act 2005 : The Institute being a national institute of Council of Scientific & Industrial Research, New Delhi falls under the ambit of Right to information Act 2005. The Division is providing information of the institute to the citizens under the Act. During the year information was provided to 10 applicants within the stipulated time. Correspondence with CSIR, New Delhi was continued from time to time. The quarterly report was uploaded in the website of the institute and the web-based individual and quarterly report of the applicants was sent to Central Information Commission, New Delhi.

Infrastructure Management: The Division had managed different activities of the Boys' and Girls' hostels, Guest house and Guest house annexe of the institute. Steps were taken to purchase new electronic gadgets, furniture's, cooking-ware, cloth materials and other essentials required to preserve the brand image of the institute. Besides, maintenance and management of the above infrastructures were also undertaken by the Division.

S&T Infrastructure Support to the Colleges of North-Eastern Region

The Department of Science & Technology, Government of India, New Delhi, in a proactive measure, had announced a special package for North East Region for strengthening science and technology teachings and researches at college level. The holistic objectives include renovation of the infrastructure, strengthening S&T teachings and researches at college level and making the colleges a source of generating high caliber manpower and repositories of national intellectual wealth in S&T sector, which in turn will lead to the socioeconomic development of NER-region in particular and country in general. NEIST-Jorhat is acting as a Central Agency for the facilitation of the same and the Division has been assigned the task of implementing the

project activities in 58 colleges of North-East India belonging to 10 universities.

The 1st and the 2nd phase of the project have already been completed in previous years and the 3rd phase of the project has been executed in this year. In the 3rd phase of the project, renovation of teachings laboratories of 58 identified colleges were undertaken for which an expenditure of Rs. 5 lakhs per college were made. Further, processes of procurement, supply and installation of teaching lab equipment worth Rs 15 lakhs for each colleges were undertaken. A grant of Rs. 1163.53 lakhs (Rupees eleven hundred sixty three lakhs and fifty three thousand only) was received by the institute from DST, New Delhi to implement the 3rd phase. The list of equipment with specification was received from the colleges, the items were compiled and specifications were normalized through designated process. The Installation of the supplied equipment was underway.

Visit to many colleges were undertaken for the physical verification of the equipment installed under the project and the renovation works accomplished on the part of the colleges and also to discuss on the future plan of project work.

Information & Business Development

As usual the Information & Business Development division continued to serve as the window of the Institute to the outside world and coordinated the overall business development activities of the Institute. The division continued to maintain the liaison activities, both public & industrial houses, entrepreneurs/users who were in need of assistance from the laboratory and also disseminated the expertise and capabilities of the Institute through various means for economic, societal and other benefits of the clients, customers and users. During the year under report the institute was celebrating the Golden Jubilee Year celebration on completion of the 50th year of glorious existence by organizing a series of programmes spanning over the year. Consequently, the division had to be surged and oriented accordingly to deal with this extra load of work particularly publications, publicity, organization of get-togethers, exhibitions, seminars, meetings, etc, in connection with the Golden Jubilee celebration.

Golden Jubilee Publications

Souvenir (On the Sands of Time)
Unforgettable Past (The Days We Can't Forget)
50 Years 50 Technology
Techtales (Series 1)
Pictorial History
Vision 2020

Regular Publications

CSIR-NEIST Highlights 2011-2012 (Annual)
CSIR-NEIST News (Bilingual Bimonthly Newsletters in Hindi-English)
INFOWATCH (Inhouse Weekly)

Book

Plant Folk-Medicines & Medicinal Plants of North East India by Subhan C Nath

Mou Signed

- A MoU was signed between CSIR-NEIST and The Science Foundation for Tribal & Rural Resource Development, Bhubaneswar on 7 April, 2011 for undertaking joint research on “Search for bioactive extracts/molecules from plant source”.
- A MoU was signed between CSIR-NEIST and All Mizoram Farmer's Union, Aizawl, Mizoram on 5 May, 2011 for imparting training in Citronella and Mushroom cultivation to the farmers of the state.
- A MoU was signed between CSIR-NEIST and Institute of Chemical Technology (ICT), Mumbai on 13 May, 2011 for research collaboration.
- The CSIR-North East Institute of Science & Technology, Jorhat, signed bilateral MoU with Agricultural Research & Development Agency (ARDA), Thailand, at a special function held on 23 June, 2011, in MS Iyengar Conference Hall, CSIR-NEIST. An 11 member delegation from ARDA-Thailand led by its Director, Dr Napavarn Noparatnaraporn paid official visit to CSIR-NEIST during 21-24 June, 2011. The basic objective for Scientific Cooperation between the Institutes of the two countries includes
 - both ARDA and NEIST will as far as practicable, exchange research information and experienced researchers with a view to mutually promote research in Science & Technology and related activities between the two countries
 - both the institutions will cooperate with each other to jointly organize academic seminars and



Dr Napavarn Noparatnaraporn (left), Director, ARDA-Thailand and Dr P G Rao (right), Director, CSIR-NEIST after signing of the MoU.

- symposiums to promote research
- both the institutions will encourage personnel to interact to strengthen the working relationships
- both the institutions will work together to promote projects of shared interest
- both the institutions will reciprocally facilitate science based innovation and fact findings resulting into business development activities and so on.

- A MoU was signed between CSIR-NEIST and University of Agricultural Sciences, Bangalore on 05 August, 2011 for the Inter institutional collaborative research work on EU-DBT Namaste project.
- A MoU was signed between CSIR-NEIST and Amity University Uttar Pradesh on 22 September, 2011 for research collaboration.
- A MoU was signed between CSIR-NEIST and North Eastern Small Scale Industries Association (NESSIA), Jorhat, Assam on 18 November, 2011, for cluster promotion and training of the technologies on household chemicals, mushrooms, banana fibres and aromatic and essential oil products for unemployed youths of North East India under CSIR-800 programme.
- A MoU was signed between CSIR-NEIST and Education Research & Development Foundation, Guwahati on 24 February, 2012, for creating a framework for research collaboration between the two Institutes.



Mr M Hoque (Left), Chairman, ERDF and Dr P G Rao (Right), Director, CSIR-NEIST exchanging the signed MoU.

CSIR-NEIST's participation in Exhibitions

State Level Science Exhibition cum Technology Demonstration Workshop held at Jorhat



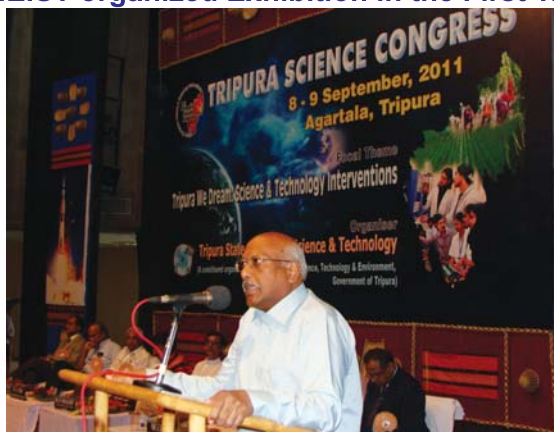
(Clock-wise from top left) Sri R C Jain, Deputy Commissioner, Jorhat, inaugurating the 4-day programme. Distribution of free solar lamp to girl students by Sri R C Jain, Deputy Commissioner, Jorhat. Student visitors inside the CSIR-NEIST stall. Dr PG Rao, Director, CSIR-NEIST speaking at the Valedictory Function.

The CSIR-NEIST, Jorhat, in collaboration with Assam Science Technology & Environment Council (ASTEC), Guwahati, organized a four-day "State level Science Exhibition cum Technology Demonstration Workshop" under the theme 'Ideas To Action : Let Us Grow With Innovation' during 24-27 May, 2011 at Jorhat Court Field. Among the other associates included the Assam Academic Centre, Jorhat, and Assam Science Society, Jorhat Branch. The objective of the exhibition was to create an exposure platform on science and technology for the upcoming students and entrepreneurs as well as common people through technology demonstration, discussion and interactive sessions. The programme was formally inaugurated on 24 May, 2011 with an inaugural function held under the Presidentship of Dr S K Choudhury, Director, ASTEC. Sri R C Jain, Deputy Commissioner, Jorhat, graced the function as the Chief Guest and inaugurated the programme by lighting the lamp. Sri Jain in his inaugural speech expressed happiness and thanked the organizers for choosing Jorhat as the venue for holding such a vital scientific event for the benefit of students and entrepreneurs and hoped that such events may be organized in future also, and the district administration will continue to provide every possible help. Commenting on the importance of the event, he mentioned that there is an urgent need to make the students and public aware about the scientific innovations that are taking place day by day and also to the entrepreneurs so that the entrepreneurs can give a commercial dimension to these innovations as a result of which only the general public can get benefitted, he opined. Earlier, Dr P C Neog, the programme Coordinator gave a brief overview of the various programmes to be held during the period. Notable among others who attended were Dr D J Bora, Principal, Jorhat Medical College & Hospital, Dr B K Dutta, Director, JIST-Jorhat and Sri Biman Baruah, Scientific officer of ASTEC, Guwahati. The meeting was largely attended by invited guests, prominent citizens, students, teachers, participants and others besides CSIR-NEIST fraternity. Dr R C Boruah in his speech said that the basic objective of the programme was to showcase the developed technologies to the masses at large through the 4-day programme. Sri Biman Boruah in his speech mentioned briefly about the activities of the ASTEC and also informed the audience about the background and objective behind creating Aryabhata Science Centres spreading over the state for the benefit of the budding

scientists. Dr Dutta mentioned about the importance of Entrepreneurship Development and its training/workshop organized by various agencies in the district. Dr Choudhury in his presidential speech cited the importance of entrepreneurship awareness programme in today's world. In this context he said that the future innovators such as the students should be motivated right from their school level. To mark the occasion a book entitled "Ideas To Action: Let Us Grow With Innovation" jointly produced by ASTEC, Guwahati and Assam Academic Centre, Jorhat was released by Dr Bora, Principal, Jorhat Medical College & Hospital. Eminent Institutions like Rain Forest Research Institute, Tocklai Experimental Station- Tea Research Association, ONGCL, Jorhat Institute of Science & Technology, Central Muga Eri Research & Training Institute, Assam Energy Development Agency, Regional Science Centre, Khanapara, Assam Tourism-Jorhat, Society for NE Handmade Paper development- Baghchung (Jorhat) and Akshay Urja shop, Jorhat actively participated in the exhibition and exhibited their technologies. From the student community, budding scientists from Aryabhata Science Centres from different blocks of various district like Sivasagar, Golaghat and Majuli exhibited their innovative science models. One of the significant activities was the distribution of free solar lantern to meritorious girl students soon after the inaugural function by the ASTEC authority. The programme came to an end with a Valedictory function held under the presidency of Dr P G Rao, Director, CSIR-NEIST in which Dr (Mrs) Sanjukta Parashar, SP, Jorhat graced the function as Chief Guest. The function was attended by Dr R C Goswami, Retd. Professor, Darrang College, Tezpur as the Guest of Honour, Dr Bijoy Sharma, Principal, J B College, Jorhat, Mr Jaideep Barua, Sr. Scientific Officer, ASTEC, Dr B P Sharma, President, Assam Academic Centre and Dr J C S Kotoky, Scientist G (CSIR-NEIST) &

President, Assam Science Society, Jorhat Branch besides CSIR-NEIST fraternity, participants and the general public. Dr Parashar, SP, Jorhat, in her address encouraged the students to inculcate scientific attitude and to solve problems in their everyday lives with a scientific approach. Dr Goswami, in his speech explained some of the basic concepts of Science for the benefit of the students and urged upon them to take up fundamental science in their career. In his presidential speech, Dr Rao said that the basic objective of the programme was to create awareness to the students as well as the entrepreneurs on the latest developments in science and technology. To mark the occasion, a colourful brochure of the workshop was released by Dr Goswami. Mr Barua while commenting on the theme of the Workshop said that the working models exhibited by the students and the exhibitors were the main attraction. Dr Kotoky, spoke on various activities of the Assam Science Society for students. Dr B P Sharma, mentioned about the decreasing status of students taking up basic science and urged the teachers as well as the parents to motivate them towards science. Dr Bijoy Sharma in his speech also stressed on the importance of basic science for the students. In the function, Dr Parashar, SP, Jorhat gave away the prizes to the winners of various competitions held while Dr Bijoy Sharma distributed certificates to the participants of the exhibition. It is worthwhile to mention here that this joint endeavor was in pursuance with the declaration of the decade 2011-2021 as the decade of Innovation by the Hon'ble Prime Minister of India, Dr Manmohan Singh in the 97th Indian Science Congress held at Thiruvananthapuram earlier this year. The programme was supported by Science & Technology Department, Govt. of Assam and also organized under the aegis of Golden Jubilee celebration of CSIR-NEIST, Jorhat.

CSIR-NEIST organized Exhibition in the First Tripura Science Congress 2011



(Left) Dr P G Rao, Director, CSIR-NEIST, delivering his speech at the Inaugural programme. (Right) Visitors at CSIR-NEIST stall.

CSIR-NEIST organized an exhibition on the occasion of 1st Tripura Science Congress held during 8 – 9 September 2011 at Agartala, West Tripura under the focal theme 'Tripura we dream: Science & Technology Interventions' covering various sectors like Agriculture, Life Science, Health Science, Ecology and Environment, Physical Science (Physics, Chemistry, Mathematics and Statistics), Engineering for Development, Earth System Science and Disaster Management, Science and Technology Education including Panel Discussions and Session on Children's Science Congress organized by Tripura State Council for Science & Technology, Govt of Tripura in association with various other institutes and organizations of Tripura. Scientists, professors, researchers and students from various national organizations, institutes and schools participated in the congress. The inaugural session was held at Nazrul Kalakhetra, Agartala under the Presidentship of Shri Joy Gobinda Deb Roy, Hon'ble Minister of Science, Technology & Environment, Tripura in which Prof Siddhartha Roy, Director IICB, Kolkata was the key note speaker while Dr SK Panda, Chief Secretary, Govt of Tripura and Prof Arunoday Saha, VC, Tripura University were the guests of honour. Along with all the speakers of the inaugural function, Dr PG Rao, Director, CSIR-NEIST delivered speech on CSIR-800. On the first day

the exhibition was held at Kalakhetra, Agartala and later to Sukanta Academy, Agartala for the rest period of the Congress. In the exhibition, CSIR-NEIST showcased its technologies, processes, agro-technologies and its activities in the North East region through banners, posters, sample exhibits and other display items. The exhibition focused on technologies ready to be commercialized with an emphasis on activities of NEIST and other CSIR laboratories in Tripura as well as in the North East India. Mr Joy Gobinda Deb Roy, Minister and Mr Sriram Taranikanti, former Commissioner & Secretary, STE, Govt of Tripura highly appreciated the NEIST activities in Tripura especially the establishment of Tripura Footwear Training cum Production Centre with a retail outlet at Udaipur, South Tripura, State Quality Control Laboratory with Soil Testing Laboratory with the assistance of NEIST at Pragati Road, Krishnanagar, Agartala, Seismic Observatory installed at Arundhatinagar, and monetary grant to MBB College, Women's College, Kailashahar College and Belonia College of Tripura for infrastructure development etc. Altogether around 1200 visitors visited the stall. The exhibition ended with a hope of further collaboration and technology transfer from CSIR-NEIST to Tripura along with a Demonstration-cum-workshop to be held on rural technologies of CSIR at Agartala, Tripura.

CSIR-NEIST participated in Science Exhibition held on the occasion of Book Fair



Mr Probin Baruah, PTO, interacting with student visitors

Along with other research organizations and institutes, CSIR-NEIST participated in science exhibition organized on the occasion of Book Fair held during 15-23 October, 2011 at JDSA ground, Jorhat and fabricated its exhibition stall. The exhibition was inaugurated by Prof S K Roy, President, Oil Technology Association of India, Eastern zone on 15 October, 2011. In the exhibition, CSIR-NEIST showcased its technologies, processes and research activities carried out by the Institute in its multidisciplinary areas through banners, posters, sample exhibits and other display items. Nearly 500 visitors largely comprising of students, entrepreneurs and general public visited the CSIR-NEIST stall.

CSIR-NEIST participated in North East India Digital Festival

CSIR-NEIST participated in the 2nd e-North East Award Summit 2011 and North East India Digital Festival along with IICT-Hyderabad on 25 November, 2011 held at Regional Institute for e-learning and Information Technology, Kohima, Nagaland. The event was organized to celebrate the implementation of best ICT practices in ICT for the Development in the NER region

and for discussion and networking with various Govt Organizations, NGOs and Private and Public sectors. On the occasion an exhibition 'TECHNOVA Expo' was organized along with Technical sessions. CSIR-NEIST participated in the exhibition by putting up a stall of Digital Display of the CSIR-NEIST Technologies and activities carried out in Nagaland.

CSIR-NEIST participated in S&T Exhibition at Pasighat, Arunachal Pradesh

CSIR-NEIST participated in the Science and Technological Fair organized by Nonyi Polo Yelam Kebang (DPYK), an NGO of Pasighat (Arunachal Pradesh) on the occasion of its Silver Jubilee Celebration at Pasighat during 30 November–6 December 2011. The exhibition was aimed at providing science exposure to the young educated youths in particular and the general public of remote tribal areas in Arunachal

Pradesh as a whole. Besides showcasing its technologies and processes developed, the Institute also displayed its various activities in Arunachal Pradesh through its branch laboratory at Naharlagun (Itanagar) by display of posters, sample exhibits, etc. The exhibition was a grand success and CSIR-NEIST stall was visited by nearly 4000 - 5000 people.

CSIR-NEIST participated in Integration Fair

CSIR-NEIST participated in the Integration Fair in '8th Jatiya Sanhati Utsav-O-Bharat Mela-2011' organized by East Bhaleya Smrity Sangha at Gobinda Nagar High School Ground at Taldi, Canning-II, South 24 Parganas, West Bengal during 10-17 December 2011. NEIST participated in the exhibition organized by CSIR along with CSIR HQ, CGCRI, IICB and

CMERI. In the rural, undeveloped and interior part of West Bengal, the fair was organized for communal harmony, awareness and popularization of science among the illiterate and semi-literate mass of people. The stall was visited by dignitaries and common people ranging from 2000- 3000 people.

CSIR-NEIST received 1st Prize for Best Exhibition stall at Tripura State Science Fair 2011-12



(Left) Visitors interacting with CSIR-NEIST personnel. (Right) CSIR-NEIST personnel receiving the prize trophy.

CSIR-NEIST participated in Tripura State Science Fair 2011-2012 organized by Tripura State Council for Science & Technology and State Education Research & Training Council, Govt. of Tripura, at Umakanta Academy, Agartala, during 5–8 January, 2012. The Science Fair was inaugurated by Shri Manik Sarkar, Hon'ble Chief Minister, Govt. of Tripura, on 5 January, 2012 at an Inaugural function held at Umakanta

Academy, Agartala. CSIR-NEIST participated in the exhibition and showcased its activities by display of posters, samples and other exhibit materials. The stall was visited largely by students and common people besides dignitaries present. It is worthwhile to mention here that CSIR-NEIST stall received the first prize for best exhibition stall.

CSIR-NEIST tableau received first prize at Jorhat District Administration's Republic Day celebration



CSIR-NEIST tableau at the Jorhat District Republic Day celebration

Every year the department is entrusted with the responsibility of Tableau preparation and participation in the Republic Day celebration organized under the aegis of Jorhat District Administration. This year also CSIR-NEIST participated in the tableau parade on 26 January, 2012 at Jorhat Court Field. The tableau represented the Institute's achievements and activities since its inception in various areas of research for development of the region in particular and the country as a whole. CSIR-NEIST received the First prize for best tableau on the occasion.

Information and Communication Technology

During the year 2011-12 the section has continued providing IT support to all division / Section of the institute in the form of un-interrupted internet service, database support, customized software support, maintenance of connectivity, etc. It is worth mentioning that the institute has got connected to 100 Mbps OFC link from NKN (National Knowledge Network) from September 2011 apart from its own total bandwidth of 8mbps. New upgraded Mail Server solution was installed and made operational from September 2011.

The Institute has added Video conferencing facility at Branch Laboratory Itanagar, Sub-station Imphal, Dr. J.N. Baruah Auditorium, Director's Conference Room and Dr. M S Iyengar Hall from March 2012. The Section had arranged several simultaneous broadcasting of some events through CCTV Network and Webcasting using Video conferencing HD Camera.

Apart from regular updating of both intranet and institute's website throughout the year webhosting for XLIII Shanti Swarup Bhatnagar Memorial Tournament (SSBMT) Outdoor Zonal held at NEIST was done in January 2012 for providing updates of the event on Internet.

In the software development front Online electricity billing systems was introduced in April 2011 through the development of own software and database. The section has already upgraded the network equipment which supports 10Gbps backbone connectivity and 1Gbps terminal connectivity for NKN compatibility. Two numbers of 20 Kva UPS systems were also inducted in the section for 24x7 uninterrupted power supplies. The Section has imparted summer / winter Training program / project to students from various engineering colleges of the country.

Knowledge Resource Centre

The Knowledge Resource Centre continued to provide library and information services to R&D divisions, Research Fellows, outside students and individuals like from universities of NE region and other R&D and industrial institutions such as Institute of Biotechnology and Geotechnique Studies, ONGC, Jorhat, Rain Forest Research Institute, Jorhat, Tezpur University, Dibrugarh University, Gauhati University, Assam University, Assam Engineering College, Jorhat Engineering College, GMIT, Guwahati etc. The KRC also provides services to NEIST Branch Laboratory, Itanagar, Arunachal Pradesh and NEIST substation, Imphal, Manipur. During the period the KRC added 10 books to its stock. It subscribed to 39 foreign and 90 Indian journals. The KRC added 1067 bound volumes of journals to its collection during the year. During the period, the KRC also collected Annual and other reports from various R&D and academic institutions.

The KRC continued to maintain database on publications and presentation of papers from the laboratory on the basis of which various reports with bibliometric analysis of laboratory's publications were

carried out as and when required by the management. A data base on Ph.D. thesis of NEIST, Jorhat was prepared and updated. Reference services were done as and when needed by the regular users and also the outside users.

The reprography section of the KRC copied 10,133 pages of documents during the period and earned an amount of Rs. 3,162/- through the services to outsiders. The library earned Rs. 5,220/- as membership fee from outside institutions, individuals and students during the period. The KRC has online access to SCOPUS database through institutional IP address. NEIST have also e-access to a number of core journals from Elsevier Science, John Wiley, RSC, OUP, CUP, Wiley, Blackwell, Springer, Taylor & Francis and ASTM DL, DLL etc through CSIR e-journal Consortium (NKRC, NISCAIR). Further the institute is also being facilitated with e-access to large number of journals from DBT e-resource Consortium, New Delhi. On-line access to Scifinder in place of printed Chemical Abstract obtained through NKRC during 2010-11 is also continued in 2011-12.

Planning

The Planning Division prepared the 12th Five Year Plan (2012-17) and Annual Plan (2012-13) of this Institute in accordance with the National Mission and CSIR Vision 2022 emphasizing R&D Focus Areas of CSIR and also

the Budget Estimate for 12th FYP (2012-17) and for the year 2012-13. The Division has prepared the Revised Budget Estimate of the year 2011-12 along with allocation & distribution of general budget/fund received

from CSIR under different heads into different inhouse projects. The completion report for 11th FYP in different categories of CSIR projects is being prepared.

The manpower deployment in inhouse, grant-in-aid, sponsored and consultancy projects were analyzed and reviewed by the division and the resource use efficiency was examined. Resource requirements and its utilization were reviewed in various stages and corrective measures were taken for better R&D management of different Inhouse projects/SIP/FAC project/ NWP/NMITLI projects/Empower projects/HCP and prepared progress report & a document entitled "Achievement of XI FYP CSIR-NEIST" which has been submitted to CSIR Hq.

The Division maintained Task Assignment Reports of Gr IV and Gr III personnel of the institute and prepared the list of Reporting and Reviewing officers of Gr III personnel for the year 2011-12. The division is maintaining the databases of Manpower of CSIR – NEIST Employees (maintained group-wise, designation-wise along with man in position & vacant position for manpower) for utilizing the information in formulating the HR policy of the Institute and division-wise equipment/instruments for audit purpose & other resource planning. Report of Consultative Workshop on "Climate Change: issues and Policy Formulation" for developing State Climate Change Action Plan of Assam on 07 June, 2011 was also prepared.

The division coordinated and organized the celebration of the CSIR Foundation Day on 26 September 2011 and organised an essay and a drawing competition among the children of CSIR-NEIST staff. A quiz competition was also organized among the CSIR-NEIST employees. Certificates and prizes were distributed to the winners on the Foundation Day Meeting. Further, Cash Awards were given to the wards of CSIR employees for excellence in sports recognized by CSIR Sports Promotion Board.

The Division has received the sanction, amounting to Rs. 28.90 lakhs for 4 externally funded projects from NCSTC (DST) and ASTEC(DST), Govt. of Assam. The division conducted two motivational programmes for talented students of NE region during 19-24 December, 2011 and 05-11 January, 2012. About 68 participants from different Higher Secondary School and Colleges of NE states participated in these programmes.

Two zonal workshops on 'Hazards – Minimizing Risk, Maximizing Awareness' were organized at Karbi Anglong during 13-14 October, 2011 and at Doomdooma during 03-04 January, 2012. About 100 participants from National Service Scheme (NSS), and National Cadet Corps (NCC) from different schools and colleges, SHGs, NGOs, health workers and hazard activists took part at these workshops.

Other two projects "State Level Science Exhibition cum Technology Demonstration" and "Students/Scientists interactive Sessions with Scientists/ Entrepreneurs" were organized by the division at Jorhat during 24-27 May 2011 with a project value of Rs. 20.00 lakh supported by S&T dept, Govt of Assam through ASTEC, Guwahati.

The division organized a sensitization workshop for development of location specific R&D and demonstration projects for SC/St dominated location on 5 January 2012 in association with ASTEC, Guwahati.

Interactions with R&D and S&T support division/sections were maintained and various supports on R&D activities and other inputs were given from time to time. During the year, various information on R&D projects, manpower utilization, financial allocations and other database information were supplied to CSIR Hq and other organizations. Database on manpower, Project budget, and statistical profile of the laboratory were utilized for efficient R&D planning. Monthly and quarterly progress reports on R&D programmes were regularly scrutinized, compiled and sent to CSIR Hq during the year.

Following Institutional Publications have been brought out

1. Summary of Plan Document for 12th Five Year Plan, during May, 2011.
2. Organizational Plans viz. 12th Five Year Plan and Annual Plan 2012-13, during December, 2011.
3. An Overview of Achievement of XI Five Year Plan brought out during July, 2011.
4. Inhouse projects of CSIR-NEIST for 12th Five Year Plan, during August, 2011.
5. Proposed projects along with estimates for 12th Five Year Plan, brought out during October, 2011.
6. Document on "Revised Budget Estimates of 2012-13 of CSIR-NEIST" brought out during October, 2011.
7. A report on "Scientist wise ongoing Projects" of the institute during June, 2011.

8. A database report on “Divisionwise list of equipment along with its status” during September, 2011.
9. Progress Report of ongoing NWP/SIP/FAC/ NMITLI projects of this institute.
10. Published one booklet “Ideas to Action – Let Us Grow with Innovation” (Compendium) during July 2011.
11. Produced one publicity material entitled “Students Scientists Interaction Meet” during July 2011.
12. Document on Report of International Training Program for delegates from Thailand, Nigeria & Egypt during July, 2011.
13. Document on Report of Consultative Workshop on “Climate Change : issues and Policy Formulation” for developing State Climate Change Action Plan of Assam on 07 June, 2011.
14. “CSIR-NEIST Vision 2020” Document of as a Team Member during September, 2011.

Project Monitoring & Evaluation

The Project Monitoring and Evaluation (PME) performs as the main center of the institute for effective project monitoring and evaluation of all R&D Projects. Contract R & D Projects, as Sponsored, Collaborative and Grant-in-Aid Projects; and Consultancy projects are undertaken by the Institute with funding from External Agencies. The Cell also monitored projects funded by CSIR like Net work Projects (NWPs), Other Lab Projects (OLPs), Headquarter Controlled Projects (HCPs), Supra Institutional Project (SIP), Technology Leadership Projects (TLPs) and Facility Creation Project (FAC). The Cell collect the relevant information from various

sources and computerized the same with own developed software and disseminate the information to the management and as well as the concerned Scientists. Monitoring and developing of complete database for report generation on projects are done and project files are created and maintained. The updating of information of various projects were continued and reports were prepared regularly for management support and other purposes. Processing of indents and maintenance of Lab Notebooks are also important activities of PME Cell.

The various activities undertaken by the Cell are as follows:

ECF Position – Database updation and preparation of Statements : Monthly statements of department wise ECF positions of the institute were prepared highlighting receipts from Govt Departments, Public and Private organizations. Total ECF of the institute during the financial year 2011-12 amounted to Rs 466.230 lakhs which

comprised receipts from Govt Depts/ Ministries, Public Sector Industries and private sector organizations to the extent of 79.82%, 15.37% and 4.81% respectively. The Commercial Rupee Value of ECF was found to be Rs 94.06 lakhs being 15.37 % of total ECF. ECF of the institute from different projects and services are shown below:

Sources	Amount received (Rs in Lakh)
Grant -in -Aid projects	4 07.503
Consultancy projects	34.123
Technical services	22.771
Miscellaneous	1.290
Royalty	0.112
Premia	0.431
Total	466.230

The area wise ECF are as follows:

Areas	ECF(in Lakh)
Agro Technology	71.66
Biological Sciences	44.49
Chemical Sciences	44.33
Engineering Sciences	66.86
Extension Centre	45.85
Geo Science	88.75
Management Science	38.48
Material Science	65.80
Total	466.23

Maintenance of Organisation Structure: Organisation Structure of the institute is maintained by the Cell in a web based package. Manpower, status of the employees including temporary staff such as SRF, JRF, Project Assistants, Woman Scientists, Research Associates etc were indicated. Changes due to new appointments, retirement, promotion etc are incorporated.

Service Tax: The PME Cell coordinated the job of working out the service tax due and accrued from the various services rendered by the laboratory. Total Service Tax realized during the year 2010-2011 (@10.30%) is Rs 5.444 Lakh which comprises receipts from various heads as follows:

Category	Service Tax (Rs in Lakh)
Consultancy Projects	3.186
Testing Charges	2.126
Premia	0.040
Misc.	0.080
Royalty	0.010
Total	5.444

Project Status: Status of Project Contracted and Completed during 2011-2012 are as follows:

SI No.	Sources Project	Project Contracted		Project Completed	
		Contract Value (Rs in Lakh)	No. of Projects	Contract Value (Rs in Lakh)	No. of Projects
1.	Grants -in-Aid	178.20	6	213.67	10
2.	Consultancy	10.504	3	54.804	2
	Total	188.704	9	268.474	12

Audit Queries: Cell prepared suitable reply statements in response to the queries raised by the Audit Party (1) Principal Director of Audit, (Scientific Department), Kolkata Branch, (2) CSIR Internal Audit.

Contribution to Lab Reserve Fund: The PME Cell has taken initiative to transfer the overhead and Non-Refundable Balance amount of Rs 34.06 Lakh from

ongoing as well as closed Externally Funded Projects to LRF in the financial year 2011-2012.

Research Utilization Data: Research Utilization Data deals with the revenue generated from the projects and other activities funded by external funding agencies undertaken by the institute. One yearly report and four quarterly reports were furnished to CSIR Headquarters regularly

External Cash Flow (ECF)
(Excluding Service Tax) (Rs in lakh)

Sl No	Category	Govt Industry	Indian	*CPSE Company	**SPSE Agency	Foreign	Foreign	Others	Total
1	Collaborative	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	R&D Consultancy	3.255	9.066	7.978	10.638	0.000	0.000	0.000	30.937
3	Grant-in-aid	316.067	1.436	45.000	0.000	0.000	0.000	0.000	407.503
4	Premia	0.000	0.391	0.000	0.000	0.000	0.000	0.000	0.391
5	Royalty	0.000	0.101	0.000	0.000	0.000	0.000	0.000	0.101
6	Sponsored R&D	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	Technical Service	6.809	9.495	3.822	1.727	0.000	0.000	0.000	21.853
Total:		371.131	20.489	56.800	12.365	0.000	0.000	0.000	460.785

* CPSE : Central Public Sector Enterprise
**SPSE : State Public Sector Enterprise

PME Cell website : PME Cell upgraded and maintained the website for display of all the project related reports on-line. The PME Cell website is linked to the NEIST Intranet and at present displays reports on Projects- (Completed, on-going, in proposal stage), Research Utilization Data, External Cash Flow, Expenditure details of all ongoing funded and network projects, Service Tax, Organisation Structure, Project Evaluation, Computer AMC, Employee List, Central Plan Scheme Monitoring System etc. Principal Investigators of projects can now access and monitor on-line the expenditure incurred in their projects. For analysis of outcome of funded projects, the on-line form has been designed and the Principal Investigators are to fill it on completion of their projects. The reports available on-line have proved to be efficient technical support for the management and scientists.

Annual Maintenance Contract of all the Computers: The PME Cell oversees the management of the Annual Maintenance Contract of all the Computers and their peripherals in the Institute. At present we have 260 Nos. of computers under AMC and 121 Nos. of computers under warranty.

Miscellaneous activities of the PME Cell include:

- Computer softwares developed (1) to generate Form-16 for all income tax assesses and (2) on "Human Resource Web Portal", displaying all the information like name, designation, date of joining, qualification, assessment, etc. of staff members. The web portal is to be linked to NEIST intranet.
- Database on all CAPART Projects evaluated by NEIST.
- Lab Notebook: 87 nos. issued, 66 nos. returned & reissued and 17 nos. were indexed and maintained for future reference and intellectual property rights protection.
- SSBMT Website: Developed a website for 43rd Shanti Swarup Bhatnagar Memorial Tournament held at CSIR-NEIST from 21-01-2012 to 23-01-2012. The website displays all the salient features and ongoing activities of the tournament. It is linked to NEIST website.

In short, the PME Division acts as a supporting division for providing required data and reports to the management as well as to the scientists in respect of externally funded projects.

Workshop & Seminar Organised

National Seminar on Plants in Diabetes organized



Dr P G Rao, Director, CSIR-NEIST speaking at the Seminar

The CSIR-NEIST organized the 2nd National Seminar on “Plants in diabetes: Prospects & Challenges” during 8-9 April, 2011 jointly with the Asian Network of Research on Anti-diabetic Plants (ANRAP), Dhaka (Bangladesh),

ERD Foundation, Srimanta Sankaradeva University of Health Sciences and Government Ayurvedic College and hospital, Guwahati. Held at Phanidhar Dutta Seminar Hall, Guwahati University, the seminar was largely attended by distinguished scientists, doctors, students and scholars from various Institutes of Bangladesh, Govt. Ayurvedic College, Guwahati, Guwahati Medical College, Gauhati University, besides the scientists of CSIR-NEIST. Prof M Mosihuzzaman, Chairman, ANRAP, Dhaka inaugurated the Seminar by lighting a lamp. The inaugural ceremony was graced by Dr P G Rao, Director, CSIR-NEIST, Prof O K Medhi, Vice-Chancellor, Gauhati University and Prof U C Sarma, Srimanta Sankaradeva University of Health Sciences. The seminar deliberated on the importance of promoting scientific knowledge in the region especially considering the NE region as biodiversity hotspot. Proposals for collaborative research work among the scholars and scientists from India and Bangladesh were discussed in the seminar.

Consultative Workshop on Climate Change held at CSIR-NEIST



(Left) Dr M Hazarika, delivering his Inaugural Address. (Right) Technical group discussion of one thematic session in progress

The CSIR-NEIST organized a day-long workshop on, “Consultative Workshop on Climate Change: Issues and Policy Formulation”, in collaboration with Assam Science Technology and Environment Council (ASTEC), Guwahati on 7 June, 2011 at CSIR-NEIST. This workshop was fourth of its kind organized by ASTEC and the first one to be organized in Upper Assam. The workshop was largely attended by eminent personalities of various institutes from in and around Jorhat town namely Small Tea Growers Association, RFRI, CMER & TI and TRA, Tocklai, AAU, Prince of



Wales, educational institutes of Majuli, representative of senior citizens of Jorhat, Assistant Conservator of forest, member from Golaghat Bar Association besides the CSIR-NEIST fraternity, both old and new. Dr Mridul Hazarika, Director, TRA, Tocklai graced the inaugural function as the Chief Guest which was presided over by Dr P G Rao, Director, CSIR-NEIST. The inaugural lamp was lighted by the dignitaries. In his inaugural speech, Dr Hazarika said that Climate Change is a phenomenon which has been taking place over the years and so, effective global and regional climate change models

should be constructed to combat the 0.01% extinction of species per year. On a regular basis 50,000 – 60,000 plant species are being utilized for various purposes and as green plants act as sink for carbon, the maintenance of biodiversity could be the vital solution, he said. As per 90 years old TRA data there has been an increase of 2°C temperature and reduction of 200m rainfall in Assam, he informed. He suggested that the topics of climate change needs to be incorporated in the early education system of schools for ensuring better understanding of the issues at grass root level. In his key note address, Dr Rao mentioned that necessary technologies and solutions to combat climate change should offer sustainable benefits to the common people for food, shelter and better healthcare. New approaches and technologies need to be evolved for quality drinking water, and to contribute towards healthcare, he mentioned. Later, the workshop was held in six thematic sessions namely, “Sustainable Habitat for quality of life”, “Water Security and sustainability”, “Sustainable

agriculture & livelihood security”, “Mitigating natural disaster and crisis management”, “Adaptation to climate change (focus on energy sufficiency and efficiency)” and “Protection and sustainable management of Forest and Wild Life” with six theme leaders. Each areas were discussed by individual groups with experts in the relevant area and was led by one theme leader. The groups had discussion and brain storming session to identify the problems in the state, review of the existing policy, development and intervention, research gap, capacity building and specific observation in local situation etc. and made recommendations in four declared aspects. In the concluding session held under the Chairmanship of Dr RC Boruah, Outstanding Scientist, CSIR-NEIST, all the six theme leaders presented the outcome of the group discussion after which the members present decided to compile the important findings to form the 'Action Plan in Assam'. Among others, the concluding session was attended by Mr Jayanta Sharma, senior representative, ASTEC.

Interactive meet with small tea planters held



(Left) Dr Pawan Kapur, Director, CSIR-CSIO, speaking at the Inaugural function. (Right) A section of audience.

A half-day Interactive meet with small tea planters and growers from in and around Jorhat was organized by CSIR-NEIST, Jorhat jointly with CSIR-Central Scientific Instrumentation Organization, Chandigarh at its premises on 23 June, 2011. The interactive meet was held with the objective to address the difficulties faced by small tea planters and growers with regard to machineries being used in their factories with suitable S&T interventions. Welcoming the gathering, Dr P G Rao, Director, CSIR-NEIST, briefed about the importance of the programme and in that connection, he also mentioned about the CSIR scheme, CSIR 800 which aims to improve the life of 800 million people living below poverty line with proven technologies from all sectors. In his inaugural speech, Dr Pawan Kapur, Director, CSIR-CSIO talked elaborately about the problems faced by the small tea planters/growers like gadgets, heterogeneity of leaf, quality of tea etc. The

inaugural session was followed by technical sessions in which Dr Kapur and Mr V P S Kalsi, CSIR-CSIO gave detailed presentations on "Instrumentation for tea processing" and "Gadgets for small tea growers" respectively. Dr Kapur in his speech said that the factors like soil, climate, variety etc., are responsible for tea quality. He discussed in detail about the different processes involved in tea processing like withering, rolling, fermentation and drying. He further said that problems with small tea planters is due to smaller land holdings, low prices fetched for tea, lack of infrastructure and finance because of which many are unable to process their own tea leaf therefore send it to Bought leaf factories which leads to heterogeneity in tea. He also informed the participants that the Model Tea factory at TRA, Tocklai was developed as a joint effort of CDAC, CSIR-CEERI-Pilani and TRA, Tocklai. In his lecture, Mr Kalsi spoke on the Environmentally

Controlled Manufacturing (ECM) system which provides scope for online testing of tea process parameters and also reduction of process time. Earlier he mentioned that India is the second largest producer of tea globally of which Assam alone produces about 40%. He discussed about the prototype of a new machine that CSIR-CSIO is working on for the benefit of small tea growers. The meet concluded with the interactive session where the speakers attended to queries put up by the participants on tea processing

machines like availability of machine for tea leaves trimming, development of the presently talked about machine etc. The interactive meet was largely attended by more than 100 participants which was proved very successful in bringing together face-to-face with the small tea growers and the CSIR organization working for their benefit. The feedback received from the growers in various aspects of tea production will be utilized for research planning of the 12th Five Year Plan of CSIR.

R&D – Industry Interactive Session on Minerals held



The Interactive session in progress

The CSIR-NEIST organized an R&D–Industry Interactive session on Minerals on 11 August, 2011. Held at M S Iyengar hall, the session was attended by experts from the Minerals sector like Prof TC Rao, ex-Professor of ISM, Dhanbad & ex-Director, AMPRI (RRL), Bhopal with Industry partners like Mr Manish Bhartia, MD and Dr A Bandyopadhyay, Vice President of CDE, Private Limited and Mr Mar Imchen, Sr Geologist, DGM, Nagaland as Resource person and Dr Zavei, Dr P G Rao, Director, CSIR-NEIST, in his welcome address, talked about the importance of the meet and expressed his gratitude to Prof T C Rao for his involvement in organization of the meet. Prof Rao in his speech encouraged the scientists to come out of their mental inhibitions and form action plans in alignment with State Government Science & Technology Departments and with Industry Partners in the relevant sector. Mr Manish gave a brief presentation about the CDE Pvt Ltd, its organizational status, various branch offices and the activity related to Iron ore and its various applications, recycling of construction and demolition of solid waste particularly in India. He expressed his appreciation to CSIR-NEIST for arranging a visit to its

different divisions during 10-11 August, 2011. He further expressed his interest in collecting more information on the work done by CSIR-NEIST on Iron ore, High Strength Proppant and Coal. Dr Bandyopadhyay presented a talk on “Processing of iron ore – A critical assessment” where he mentioned in detail the iron ore washing technology, Process development and engineering Technology of the high grade ore, washing of ore, per se beneficiation, benefits of using washed ore, CDE technology operating in India, results of washing, test results for Jigging fines, pulsator Jig for production and Nano wash for slime beneficiation. CDE provides technical services for iron ore beneficiation and a video on one iron ore plant was also presented. Sand manufacture from stones was also presented which would be high in demand in North Eastern States like Nagaland, he opined. Dr Zavei in his speech stated that in Nagaland, the available iron ore is hematite with Chromium and Nickel etc. He said that the state requires utilization of lime stone too. In this context, Prof Rao suggested about GSI or other survey organization for carrying out mineral survey of the region and other State Council of Science and Technology of all North Eastern states for identifying areas where CSIR-NEIST may extend its help and then further its linkage with the industry and entrepreneurs for bringing socio-economic development in the region. NEIST scientists have a crucial role to play with the state council of science & technology and also with industry partners and entrepreneurs of the region who may be primarily selected by State Science & Technology Council, Dr Rao said. A video was also displayed on 150 Tph construction and demolition waste recycling plant of CDE. Dr B P Barua, Principal Scientist & Head, Coal Chemistry Division, CSIR-NEIST gave a presentation on “R & D – Industry Interactive session on energy minerals of NER for gainful utilization – an Appraisal”. Prof Rao highly appreciated the presentation describing the complete package of Coal of the region. He advised to do the analytical work like prospect of

mineral utilization in the region, identifying the specific types of coal used in specific industries before approaching the industrial partners. "Characterization, beneficiation and utility study of some graphite deposits from Arunachal Pradesh" was presented by Dr P Sengupta, Chief Scientist & Head, Materials Science Division, CSIR-NEIST. The meet ended with a plan for collaborative work among the State S & T Councils,

CSIR-NEIST, Industry partners and other Govt. Departments. It was also opined that necessary modification and scaling of the plants with smaller capacity may be taken up for the benefit of the local entrepreneurs which would help them to operate better in the region. Future collaborative ventures between the two organizations was also discussed during the period of their stay.

National Workshop on Sustainable Road Technologies held at CSIR-NEIST



(Left) Shri M C Boro, Commissioner & Special Secretary, Govt of Assam, delivering his address. Also seated on the dais (From right), Dr P G Rao, Director, CSIR-NEIST; Dr S Gangopadhyay, CSIR-CRRI and Dr P K Jain, Chief Scientist, CSIR-CRRI. (Right) A section of audience at the Workshop.

The CSIR-Central Road Research Institute, New Delhi organized an one day 'National workshop on Sustainable Technologies for Road Construction in NE' jointly with CSIR-NEIST at CSIR-NEIST premises on 19 September, 2011. The Workshop was supported by Public Works Department, Govt of Assam and was the first of its kind in the region and nearly 180 participants from various organizations in India, specifically from the North East like Border Road Organisation, Public Works Department, Govt of Assam, Dibrugarh RR Divn., Jorhat Road Circle, MES-GE- Jorhat (Army), NHA, IIT-Guwahati, EIPL and private companies from Guwahati like BitChem, Om Infracon Pvt. Ltd etc. participated in the workshop. Held at Dr JN Baruah auditorium, the inaugural function of the workshop was presided over by Dr S Gangopadhyay, Director, CRRI where Shri MC Boro, Commissioner & Special Secretary, Govt of Assam attended as the Chief Guest. The workshop was largely attended by engineers, scientists, Govt officials, students and faculties from several Engineering Institutes of North East and others. Dr Gangopadhyay gave the presidential remarks and mentioned that poor transportation leads to poor economy and so the search for sustainable connectivity is vital for the growth of the region. A modern transport system should be sustainable both economically and environmentally, he informed. He further said that energy efficient technologies like Bitumen Additive and Warm Mixes are required to develop ecological corridors in the biodiversity rich states

of the North East India and therefore the workshop is organized including researchers, industries and local administration for making sustainable roads for the most deserving states of the region. In his welcome address Dr P G Rao, Director, NEIST mentioned that the region lacks proper road connectivity and for this reason specific technologies should be developed. He said that already in the 9th and 10th Five Year Plan, CSIR-NEIST has completed projects on better utilization of bitumen for energy efficient technology for road construction and hence, CSIR-NEIST in association with CSIR-CRRI can supply quality material and work in this aspect. On the occasion, a document on "National Workshop on Sustainable Technologies for Road Construction in North East" was released by Mr Boro, Chief Guest of the function. In his address, Mr Boro urged the scientists, engineers and the like to generate energy efficient technologies and also to take the challenge to make green roads accessible to all. He informed that Cold Mix Technologies for construction of roads have already started in Assam whereas in green way Vetiver grass is used for slope protection in Assam. In summation he stressed upon development and implementation energy efficient technology for construction of road which would also help to earn carbon credit. Later, in the technical sessions, deliberations were held on Rural Roads for NE Region, Emulsions & Cold Mix Technologies, Warm Mixes and Adhesion Promoters & Patching Technologies.

Zonal level workshop on Hazards– Minimizing risk, maximizing awareness organized



(Left) Mr M Rahman, Sr Technical Officer & Coordinator of the Workshop delivering his lecture during the technical session. (Right) The participants along with the organizers.

The CSIR-NEIST organized a two-day zone level workshop on “Hazards—Minimizing risk, maximizing awareness” during 13-14 October, in collaboration with Aryabhata Science Centre, Karbi Anglong district at Kheroni Girls' High School, Kheroni, Karbi Anglong. The Workshop was attended by more than 52 participants comprising of members of NCC, NSS, hazard activists from the districts of Hailakandi, Karimganj, Cachar, N C Hills, Karbi Anglong and some neighbouring areas of Kheroni. A short inaugural function was held under the Presidentship of Mr Bipul Lashkar, Headmaster, Kheroni High School, on 13 October, 2011 where Ms Usha Rani Gohain, Principal, Kheroni Higher Secondary School, attended as the Chief Guest. Addressing the gathering, Ms Gohain spoke about the importance of the workshop in such a hazard-prone remote locality. Mr M Rahman, Sr Technical Officer, CSIR-NEIST & Coordinator of the workshop gave some highlights about the history and achievements of the past workshops organized by the laboratory for the same cause and said that the

workshop is catalyzed and supported by NCSTC, DST New Delhi, Govt. of India. Mr Kulen Kalita, faculty member of Diphu High School, Karbi Anglong, spoke about the aim and objective of the workshop. In the function, solar lamps were distributed as prizes to three meritorious students who secured top position in HSLC 2009-10 examination by Mr Biren Deka, Science teacher, Kheroni Girls' High School and Coordinator, Aryabhata Science Centre, Rongkhang Block which was sponsored by ASTEC, Govt. of Assam.

The workshop deliberated on various issues on hazards and its protective measures through technical lectures and live demonstrations delivered by several resource persons. The resource persons included Prof Aboni Bhagawati, Guwahati University; Mr Rahman; Shri Horen Pegu, Lonka Fire Station, Karbi Anglong; Dr Debakar Goswami, Associate Professor and Head –Botany Deptt, Hojai College; Dr Jatin Kalita, Jr Scientist, CSIR-NEIST; Dr Dipul Kalita, Scientist, CSIR-NEIST and Dr Jaydhan Timung, I/c Kheroni, SAC.

CSIR-NEIST Substation organized workshop-cum-exhibition for novel products based on ethnic designs and materials



(Left) Lighting of lamp by the Chief Guest. (Right) Display of variety products based on ethnic designs of Northeast.

CSIR-NEIST Substation, Imphal organized a 2-day workshop-cum-exhibition for novel products based on ethnic designs and materials of northeast jointly with

CSIR-Central Leather Research Institute, Chennai during 18-19 November, 2011 at its premises. In the Inaugural function held on 18 November, 2011 Dr H B

Singh, Scientist-in-charge, CSIR-NEIST substation gave the welcome address while Dr D Chandramouli, Chief Scientist, CSIR-CLRI, gave a brief profile about the programme and the contribution of CLRI in leather research and emphasized on the need for value addition to indigenous leather products by adapting ethnic designs of North East for generating higher marketability across the globe. Besides, CSIR-NEIST fraternity and other notable dignitaries, the workshop was attended by Dr T Meinva, Hon'ble Member of Parliament (Lok Sabha), Dr PG Rao, Director, CSIR-NEIST, Jorhat and Shri Radha Binod Koijam, MLA (Ex-Chief Minister), Manipur as the Chief Guest, Guest of Honour & President of the workshop respectively. Dr P G Rao,

mentioned about the contribution of NEIST to the region and further assured that NEIST will act as a link between other CSIR laboratories to bring technologies other than its own, which will be useful for the local population of this region. Dr T Meinva, Hon'ble Member of Parliament (Lok Sabha) stressed that Research and Development is the key for overall development. Shri Radha Binod Koijam, former Chief Minister and Hon'ble MLA, Manipur, in his Presidential speech emphasized on vocational training for the employed youths by S&T intervention. In the workshop, forty five ethnic products jointly developed by CSIR-CLRI and CSIR-NEIST were displayed in the exhibition for public view.

CSIR-NEIST and CSIR-CSIO jointly organized interactive meet with small tea planters

CSIR-NEIST organized an interactive meet with small tea planters jointly with its sister laboratory, CSIR-CSIO, Chandigarh at Dibrugarh University on 20 November, 2011 with an objective to address the difficulties being faced by the small tea planters and growers with regard to the machineries being used in their factories and possible S&T interventions towards finding solutions of these difficulties. The meeting was presided over by Sri Aswini Barua, President, All Assam Small Tea Growers Association (AASGA), State Committee and attended by Dr Pawan Kapur, Director, CSIR-CSIO, as the Chief Guest and Mr P K Goswami, Chief Scientist, CSIR-NEIST, besides invited guests and the participants. Dr Pawan Kapur, in his address spoke elaborately about the problems faced by small tea planters/growers like gadgets, heterogeneity of leaf, quality of tea, etc. Dr Kapur also gave detailed presentations on "Instrumentation for tea processing" and "Gadgets for small tea growers" where he spoke about factors responsible for tea quality like soil, climate, variety, etc. He discussed in detail about the different processes involved in tea processing like withering, rolling, fermentation and drying. He further said that problems with small tea planters is due to smaller land holdings, low prices fetched for tea, lack of infrastructure and finance because of which many are unable to process

their own tea leaf therefore send it to brought leaf factories which leads to heterogeneity in tea. He also informed the participants that the Model Tea factory at TRA, Tocklai was developed as a joint effort of CDAD, CSIR-CEERI, Pilani and TRA, Tocklai. He also explained the Environmentally Controlled Manufacturing (ECM) system which provides scope for online processing of tea thereby maintaining the process parameters ultimately leading to reduction of process time of quality manufacturing. Earlier he mentioned about the prototype of a new machine that CSIR-CSIO is in the process of making keeping in mind the small tea growers. In the interactive session, deliberations were held on the problems faced by the growers and queries posed by the participants on tea processing machines were discussed. Delivering his presidential address, Sri Aswini Barua appreciated the efforts of CSIR in developing such affordable gadgets for small tea growers. He further appealed for taking up the matter at higher level on issue of license for small tea factory. Dr Kapur assured the tea growers that the feedback received from the growers in various aspects of tea production will be utilized for research planning of the 12th Five Year Plan of R&D projects. The meet concluded with vote of thanks proposed by Mr Anil Phukon, Executive member, AASGA.

Workshop on Documentation and Assessment of Local Health Traditions held

Under the auspices of North Eastern Institute of Folk Medicine (NEIFM), Pasighat, Arunachal Pradesh, a workshop of field investigators on Documentation and Assessment of Local Health Traditions in Assam was organized by the CSIR-NEIST in collaboration with the Centre for Local Health Tradition, Institute of Ayurveda and Integrative Medicine, Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore during 12-

19 December, 2011. The workshop was inaugurated by the Chief Guest of the session, Mr Otem Dai, IAS, Director, NEIFM, Pasighat. Delivering his inaugural speech, Mr Otem Dai, briefed about the aims and objectives of NEIFM and its activities. The Guest of Honour was Mr G Hariramamurthy, Assistant Director, FRLHT, Bangalore who explained the objective of the programme. Dr P G Rao, Director, CSIR-NEIST,



(Left) Mr Otem Dai, IAS, Director, NEIFM, speaking at the Inaugural function as Chief Guest. Also seen in the dais from right, Mr G Hariramamurthy, Assistant Director, FRLHT, Bangalore; Dr P G Rao, Director, CSIR-NEIST and Dr S C Nath, Chief Scientist, CSIR-NEIST. (Right) Participants along with Mr Otem Dai, IAS and Dr P G Rao.

presided over the inaugural session. He appreciated the effort of NEIFM, Pasighat for the particular job proposed by the Institute in Assam and North-East India. He also welcomed the NEIFM to join hands with CSIR-NEIST for necessary validation of folklore claims as well as chemical investigation of folklore medicinal plant resources for isolation and formulation of therapeutic agents. The inaugural session was followed by five technical sessions which included deliberations of the resource persons from FRLHT, Bangalore, NEIFM, Pasighat, CSIR-NEIST, Jorhat and Loli Geotech and Associates, Nagaland, field visits to forest and ethnic villages, NGOs R&D centre like Regional Research and Training Centre on Indian Traditional Treatment, Golaghat, interactions, demonstrations, exhibitions of medicinal herbs and herbal products, documentation and

assessment of local health traditions of the ethnic societies and rural masses. The programme was largely attended by concerned participants including traditional healers prescribing folklore medicines and several NGOs. The workshop concluded with a valedictory session on 19 December, 2011 which was presided over by Dr R C Boruah, Outstanding Scientist, CSIR-NEIST. In his remarks, Dr Boruah expressed his happiness to the participants from different places for their keen interest and active participation in the workshop. Giving their feedback on the workshop, the participants expressed their happiness as well gratefulness to CSIR-NEIST for inviting them to attend the workshop. To carry forward the local health traditions in a scientific and meaningful way, a Folk Healer's Association named "Folk Medicine Practitioners Association, Assam" was constituted.

Workshop on civil infrastructure technologies for Northeast Region held



(Left) Prof D V Singh (in centre), DST expert, New Delhi speaking at the Inaugural session. Dr R C Boruah, Outstanding Scientist & Director-in-charge and Prof D N Trikha, DST expert are seen on his left and right respectively. (Right) Workshop in progress.

CSIR-NEIST organized a two-day workshop on "Civil infrastructure technologies for Northeast Region" during 28-29 February, 2012 at its premises which was supported by Department of Science & Technology, New Delhi. The Inaugural session was held at M S Iyengar hall, under the chairmanship of Prof D V Singh, DST, New Delhi in which Er K G Deb Krori, Chief Consultant,

Water & Power Consultancy Service (WAPCOS), a Govt. of India Undertaking, attended as the lead speaker. Other notable DST personnel present were Prof D N Trikha and Mr Rajeev Sharma. Besides CSIR-NEIST scientific fraternity, the session was attended by 30 officials from Indian Institute of Technology-Guwahati, North East Regional Institute of Water and Land

Management-Tezpur, North East Regional Institute of Science & Technology-Arunachal Pradesh, National Institute of Technology-Silchar and Bengal Engineering and Science University-Shibpur, Kolkata. In his opening remarks, Mr P Barkakati, Senior Principal Scientist & Principal Coordinator of the workshop briefed about the workshop and its objective. Delivering his welcome address, Dr R C Boruah, Outstanding Scientist and Director-in-charge, CSIR-NEIST stressed on the need for organizing such workshop considering the present infrastructural facilities in civil arena in the region which needs to be addressed in such a forum so as to provide solutions to the problems through exchange of expertise. The two-day workshop deliberated on various problems and issues related to the NE region in terms of civil infrastructure and its present scenario. The welcome address was followed by a lead talk delivered by Er K G Deb Krori, on 'Challenges for Engineers in the context of India's NE towards a prosperous India'. In his lecture, Er Krori gave a detailed insight on the civil

engineering infrastructure in Northeast constituting housing sector, road construction, bridge, dams, flyover, transportation and communication services. Er Krori also suggested some measures for effective management of finance in various engineering works and various advanced technologies that can be adopted by state departments for improving the civil infrastructure scenario. It may be mentioned that earlier Mr S Deori, Senior Scientist, gave a brief introduction of the speaker before the gathering. The two-day workshop covered brain storming deliberations in four sessions where participants from various institutes presented concept papers. The Workshop ended with the formation of five sub-groups of urban housing, road transportation, bridge & structures, civil engineering construction materials and energy efficient construction. The Workshop also called for project proposals with emphasis for collaboration and networking of allied institutes in the region.

CSIR and TSCST jointly organized 'Demonstration-cum-Workshop on CSIR rural technologies'



(Left) Shri Joy Gobinda Debroy, Hon'ble Minister of Science & Technology, Govt. of Tripura, speaking at the Inaugural function. Also seen seated on the dais (from right) are, Dr P G Rao, Director, CSIR-NEIST and Shri M L Roy, Member Deputy Secretary, TSCST. (Right) Participants attending demonstration on Biomass drier by CSIR-IMMT personnel.

The CSIR-NEIST as a nodal CSIR laboratory organized a two day 'Demonstration cum workshop on rural technologies developed by CSIR' in collaboration with Tripura State Council for Science & Technology (TSCST), Govt. of Tripura during 2-3 February, 2012 at State Institute of Public Administration and Rural Development (SIPARD), Agartala, Tripura. Among other CSIR laboratories, CSIR-Institute of Materials and Minerals Technology, Bhubaneswar; CSIR-Central Leather Research Institute-Chennai and CSIR-Central Mechanical Engineering Research Institute-Durgapur

participated in this 2-day workshop. The workshop was aimed at creating an awareness on CSIR rural technologies and also to disseminate the same for the benefit of unemployed youths and women self help groups through exhibition and suitable demonstration. A total of 74 participants from various SHGs, NGOs, unemployed youths and local entrepreneurs from different districts of Tripura participated in the workshop. The workshop begun with opening remarks on 2 February, 2012 by Dr P G Rao, Director, CSIR-NEIST. Held at Seminar hall, SIPARD, Dr

Rao, in his speech briefed the participants about the objective of the workshop and gave an insight on some CSIR rural technologies which have the potential to augment the economic condition of rural people. He also mentioned about CSIR 800 programme which is aimed at improving the lives of 800 million people of India through Science & Technology intervention. Later, technical lectures were delivered by personnel from CMERI, Durgapur and IMMT, Bhubaneswar wherein discussions were held on societal activities through some of their proven rural technologies. It is to be mentioned that later, the workshop was formally inaugurated at an Inaugural function held in afternoon hours at Seminar hall, by Shri Joy Gobinda Debroy, Hon'ble Minister of Science & Technology, Govt. of Tripura who attended the function as the Chief Guest. Notable present at the function were, Shri Banmali Sinha, Principal Secretary, Science, Technology & Environment, Govt. of Tripura, Shri P Biswas, Director, Science, Technology & Environment, Govt. of Tripura, Shri M L Roy, Member Deputy Secretary, TSCST and Dr P G Rao, Director, CSIR-NEIST, besides, CSIR and TSCST personnel and the participants. In his welcome address, Shri P Biswas stressed on the need of such a programme not only for awareness generation but also to bring the benefits of S&T to common man. Shri M L Roy spoke about the genesis of the workshop while addressing the gathering. Speaking at the function, Mr Debroy urged the participants to take full advantage of the workshop. He further requested the Director, CSIR-NEIST to set up an outreach centre at Tripura so as to benefit the people at large. Dr Rao in his address expressed gratitude to TSCST, Govt. of Tripura for joining hands with CSIR through CSIR-NEIST in bringing out this special workshop. He further appealed to the government to lay more emphasis on entrepreneurship development for the benefit of unemployed youth and women folks. He also said that CSIR-NEIST is ready to extend all assistance in organizing such workshops in future and may even coordinate to set up a reach out centre in Tripura as appealed by the Chief Guest.

On 3 February, 2012, Dr Rao gave a detail presentation on some rural technologies developed by CSIR-NEIST namely Banana fibre extraction process, liquid deodorant cleaner, low dust chalk pencil, pulse storage structure etc. while Dr A K Bordoloi, Principal Technical Officer, CSIR-NEIST spoke on mushroom cultivation technique.



Demonstration on Mushroom cultivation to the participants by CSIR-NEIST personnel.

The hectic two day workshop covered technical sessions and practical demonstration by personnel from the participating CSIR laboratory on Biomass Drier, Energy efficient low cost bakery oven, Terafil water filter, Hand pump attachable iron removal plant, Hand bags from leather, Low dust chalk pencil, Extraction of fibre from Banana pseudo stem and Mushroom cultivation. The participants noted down the important steps of these technologies and actively participated in the various making processes of the same. The Workshop came to an end with a short Valedictory function on 3 February, 2012 which was attended by Shri P Biswas, Shri M L Roy and Dr P G Rao along with the participants and personnel from CSIR and TSCST. In the function, the participants shared their experience about the workshop and its overall activities. One of the participant, Mr Ashutosh Pal, and also an entrepreneur of Banana fibre was provided some suggestions to market his products in various Govt. emporium outlets. Shri Biswas acknowledged the various important technologies developed, transferred and available for transfer and requested the participant entrepreneurs to utilize the available CSIR technologies. Shri Roy appreciated the active participation and involvement of the participants in the workshop. A total of 74 participants comprising of various SHGs, NGOs, unemployed youths and local entrepreneurs showed keen interest and enthusiasm to learn the technologies. The participants also gave their feedback about the programme in a suitable feedback form.

Zonal Level Workshop on Hazards organized



(Left) Mr M Rahman, Coordinator of the workshop delivering his technical lecture. (Right) A section of the participants.

With an objective for generating awareness and preparedness about natural hazards, CSIR-NEIST organized a two-day zone level workshop on, “Hazards–Minimizing Risk, Maximizing Awareness” during 3-4 January, 2012 jointly with Doomdooma College, Rupai Diding, Dist. Tinsukia, Assam which was supported by RVPSP, DST, New Delhi. The workshop was inaugurated by Dr Aruna Gogoi Barua, Principal Incharge, Doomdooma College, by lighting a lamp on 3 January. The workshop comprised of technical lectures and practical demonstration on important safety measures. Lectures were delivered by Dr P K Bora, Sr Principal Scientist, CSIR-NEIST, Dr Jatin Kalita, Jr Scientist, CSIR-NEIST, Mr M Rahman, TO, CSIR-NEIST and Coordinator of the workshop, Shri Nabhajit Goswami, student, NIT-Silchar and Dr Nabajyoti Gogoi, Senior Medical Officer, Doomdooma. Dr Bora spoke about the earthquake science with special reference to management of earthquake hazard. Shri Goswami detailed on the fundamentals of disaster and its mitigation. Shri Rahman, delivered a talk on earthquake

management. Md Iltab Hussain, Fire Station Officer, Doomdooma, delivered a lecture cum demonstration about fire hazard along with his colleagues. Dr Kalita delivered a lecture on chemical hazards and mentioned some important precautionary measures to be adopted while applying pesticide, fungicide, fertilizer, etc. on plants and cultivated soil. Shri Rupanta Sonowal, Wireless Operator and Demonstrator along with his colleagues from Civil Defence, Doomdooma, presented various techniques to be applied during rescue operations post hazards. Dr Nabajyoti Gogoi, in his talk spoke about various first aid measures to be applied for quick recover post hazards. The workshop came to end with a short Valedictory function on 4 January, 2012. Presiding over the function, Ms Bina Devi Bordoloi, Sr Lecturer, Doomdooma College, expressed her appreciation for organizing such an important workshop for the benefit of common people. In the function, certificates were distributed to all the participants. About 70 participants from in and around Doomdooma participated in the workshop.

CSIR-NEIST and CSIR-CRRI jointly organized workshop on sustainable road technologies for NER

CSIR-NEIST organized a two-day workshop on “Sustainable road technologies for NER” jointly with CSIR-CRRI, New Delhi, the nodal body for road research, during 4-5 February, 2012 at Pragna Bhawan, Agartala, Tripura, in association with PWD, Govt. of Tripura and sponsored by Bitchem, Guwahati. The workshop was inaugurated on 4 February, 2012 at Seminar hall, Pragna Bhawan which was attended by Mr Sunil Bhowmick, Chief Engineer (Roads), Govt. of Tripura, Dr S Gangopadhyay, Director, CSIR-CRRI and Dr P G Rao, Director, CSIR-NEIST, besides, a large gathering of CSIR scientists and officials from PWD, Govt. of Tripura. In his address, Dr Rao said that the terrain in and around 70 percent of NER is hilly and mountainous and so unlike plains, the construction of



Dr P G Rao, Director, CSIR-NEIST in the Inaugural session.

roads in hilly areas is different, extremely difficult and much expensive. Dr Rao stressed on the importance to innovate and use new technologies for faster and enduring roll out of roads. Addressing the participants, Dr Gangopadhyay spoke about environment-friendly and sustainable technologies available for roads construction, suited for hilly, cold or rainy conditions peculiar to NER. He said that it is imperative to enhance rural connectivity by use of such technologies. He further informed that CRRRI has been constantly striving to push new and sustainable technologies in road construction across the country and recently the Institute has transferred an exclusive license to Bitchem to supply cold mix emulsion in NE. It can be mentioned here that

Bitchem is India's pioneer in introducing and commercializing the cold mix technology in India. Shri Sunil Bhowmick, Chief Engineer (Roads), Govt. of Tripura, also acknowledged the need for expediting roads construction to enhance rural prosperity. Later, the workshop was held in three technical sessions wherein deliberations were held on the Rural Roads for NE Region, Emulsions & Cold Mix Technologies, Warm Mixes, Microsurfacing, Environmental and legal aspects on road construction, etc. A partial demonstration on application of cold mix technology was given on 5 February, 2012. This workshop was attended by more than 150 nos. of local engineers and officers from various govt. departments and private agencies.

Brain storming session on tea and sericulture held

A brain storming session on tea and sericulture was held between CSIR-NEIST, ARDA-Thailand and The Queen Sirikit Dept. of Sericulture and Tea Institute, Mae Fah Luang University, Thailand on 20 March, 2012 at Dr M S Iyengar hall. The team of delegates from Thailand led by Dr Peeradet Tongumpai, Director, Agricultural Research Development Agency, Bangkok, Thailand included Mr Prasert Gosalvitra, Director General Director, The Queen Sirikit Dept. of Sericulture; Ms Oratai Silapan, Deputy Director General, The Queen Sirikit Department of Sericulture; Dr Theerapong Theppakorn, Director, Tea Institute, Mae Fah Luang University; Miss Mullika Kulsiripruck, Foreign Relations Officer, ARDA; Mr Saridiporn Chuprayoon, Director, The Queen Sirikit Dept. of Sericulture, and Mr Sompol Nillavesana, Expert from Dept. of Agriculture.

Representatives from the counterpart included Dr P G Rao, Director, CSIR-NEIST, scientists and researchers from Biotechnology division; Medicinal, Aromatic & Economic Plants division, Chemical Engineering division and Information & Business Development division. The session was also attended by representatives from Tea Research Association, Tocklai as tea experts. Dr R C Boruah, Outstanding Scientist, delivered the welcome address and briefed about the activities of CSIR-NEIST. Dr Rao gave a brief introduction of the series of events that led to the signing of Memorandum of Understanding (MoU) between ARDA and CSIR-NEIST in 2011. The brainstorming session deliberated on various issues related to research in tea and silkworm with technical lectures delivered by the dignitaries. Dr Peeradet Tongumpai said that the session is the beginning of scientific activities between the two Institutes for sustainable development between the two nations. In this regard, emphasis has been made in the area of tea and sericulture for



The brain storming session in progress.

exchange of data and manpower training, he said. Besides that, the Institute would also promote activities in medicinal and aromatic plants cultivation suitable to the agro-climatic conditions of Thailand which is similar to the NE region. Mr Prasert Gosalvitra, spoke on the activities of the Queen Sirikit Dept. of Sericulture, on mulberry and sericulture and conservation of silkworm germplasm. Dr Theerapong Theppakorn, stressed on the collaboration in tea research and tea testing of Oolong tea, Green tea and DNA fingerprinting of tea. Mr Sompol Nillavesana, called for collaborative work to improve new variety of tea collected from wild areas and study on agro-climatic diversity of tea to observe the changes in tea variety due to climate change. Mr N C Gogoi, Sr Principal Scientist, informed that a technology for extraction of polyphenols from tea leaves is available with CSIR-NEIST. He further informed that the process is suitable for green tea and fresh leaves as well which contains less polyphenols. Besides this, an extraction process of tea seed oil technology is also ready with CSIR-NEIST, he said.

Dr B G Unni, Chief Scientist detailed on the current scenario of Eri sericulture R&D activities in India with the

contribution of CSIR-NEIST in sericulture research, future programme for collaboration to improve sericulture research and also mentioned on the technology for extraction of oil from pupae waste. Dr P R Bhattacharya, Head– Medicinal Aromatic & Economic Plants Division said that techniques of breeding along with high efficiency of breeding can be improved by selection of superior host plants and selection of superior breeding techniques which is dependent on geo-tropical conditions.

The session concluded with following future action plans under the collaboration.

1. To impart training to personnel from Thailand on DNA fingerprinting in tea.
2. Biochemical and chemical analysis of tea and tea testing.
3. Microbial control of disease and improvement on tea, extraction of polyphenols.
4. Exchange of scientists of both the countries to deliver lectures and acquaint with techniques related to the specific areas of research.
5. Formulation of collaboration on research project on global warming studies related to tea and other areas.
6. Impart training to personnel from Thailand on selection of superior host plants, silkworm rearing techniques and other areas of common interest.
7. Formulation of collaborative project in areas of disease control and value addition of raw material of sericulture on the basis of feasibility studies.